HITACHI

MODEL V-202F/V-203F
V-352F/V-353F

OSCILLOSCOPE

SERVICE MANUAL

Hitachi Denshi, Ltd.

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NOTICE

This Service Manual describes the most typical product of this model. If there are any specific differences between this Manual and the servicing unit, please contact Hitachi Denshi sales office in your area.

MODEL V-202F/V-203F/V-352F/V-353F
OSCILLOSCOPE
Service Manual

1. STANDARDS AND SPECIFICATIONS

1. 1 V-202F/V-203F

o Vertical deflection

Input sensitivity	x1 5mV/div to 5V/div (1,2,5-step 10 stages) x5 1mV/div to 1V/div (1,2,5-step 10 stages)
o Sensitivity accuracy rate	x1 $\pm$ 3 % x5 $\pm$ 5 % Attenuates continuously to 2.5 times or more of the indicated value in each range
Frequency bandwidth (8 div Reference)	x1 DC to 20 MHz ($^{+1}_{-3}$ dB) AC 20 Hz to 20 MHz ($^{+1}_{-3}$ dB) x5 DC to 7 MHz ($^{+1}_{-3}$ dB) AC 20 Hz to 7 MHz ($^{+1}_{-3}$ dB)
Rise time	x1 Approx. less than 17.5 ns x5 Approx. less than 50 ns
Over shoot	x1 $\pm$ 3 % (at 100 kHz) x5 $\pm$ 5 % (at 100 kHz)
Input impedance	Direct 1 MΩ, approx. 30 pF
Maximum input voltage	Direct 500 Vp-p or 300 V (DC + AC peak at 1 kHz) When using probe 600 V (DC + AC peak at 1 kHz)

Input coupling — AC-GND-DC

Magnifying function — x5 is possible

Operation mode — CH1, CH2, DUAL, ADD, DIFF

Dynamic range — more than 8 div.

CH1 output

Output voltage* — 20 mV/div Min.

Bandwidth* — 50 Hz-5 MHz (-3 dB) (at x1 GAIN)

Output noise* — 10 mVp-p Min.

* Measured by 1 m 50-ohm BNC cable with 50-ohm terminator.

Output impedance — Approx. 50 Ω

Output coupling — AC

o Horizontal deflection

Sweep mode — AUTO, NORM, TV(+), TV(-)

Sweep time — 0.2 μs/div-0.2s/div(1-, 2, 5-step 19 stages)

Maximum sweep time — 100 ns (at MAG x10)

Sweep variable — 2.5 times or more

Sweep time accuracy — ±3 % (at x1)
±5 % (at x10 MAG)

Sweep magnification — x10

Time linearity — ±3 % (at x1)
±5 % (at x10 MAG)

Position adjustment — Possible

o Triggering

Coupling — AC

Triggering polarity — +, -

Triggering sensitivity and frequency

Frequency	Internal	External
20 Hz - 2 MHz	0.5 - div	200 mV
2 MHz - 20 MHz	1.5 - div	800 mV

TV-V sensitivity — SYNC section more than 1 div or 1 V

External trigger input impedance — Approx. 1 MΩ, approx. 30 pF

Maximum input voltage	Direct 300 V (DC + AC peak at 1 kHz) At using x10 probe 600 V (DC + AC peak at 1 kHz)

o Z-AXIS brightness modulation

Voltage	Brightness is reduced with a positive signal of +5 V or more
Frequency bandwidth	DC to 2 MHz
Input impedance	Approx. 47 kΩ
Maximum input voltage	30 V (DC + AC peak)

o X-Y operation

X input	CH1
Y input	CH2
Sensitivity	Same as vertical axis
X frequency bandwidth	DC to 500 kHz (-3 dB)
Phase shift	Within 3° (DC to 50 kHz)

o Calibrator

Waveform	1 kHz square wave, within ±10 % (Typical)
Voltage	0.5 V ± 3 %

o CRT

CRT	140BMB31R (5.5, square with internal graph)
Acceleration voltage	Approx. 2 kV
Screen area	8 div x 10 div, 1 div=9.4 mm
Trace rotation	Present
Scale illumination	Variable edge lighting

Power supply

VOLTAGE	FUSE
100 V (90-110 V)	2A
120 V (108-132 V)	2A
220 V (198-242 V)	1A
240 V (216-264 V)	1A

Power supply frequency	50, 60 Hz
Power consumption	Approx. 45 W

o Environment

Rated range of use:	+10 to +35 °C
Limit of operation:	0 to +40 °C
Storage and transport:	-20 to +70 °C
Operating ambient humidity:	35 to 85 %

o Construction

Dimensions	Approx. 275(W) x 190(H) x 400(D)(mm) (Dimensions of cabinet)
Weight	Approx. 8.5 kg

1. 2 V-352F/V-353F

o Vertical deflection

Input sensitivity	x1 5mV/div to 5V/div (1,2,5-step 10 stages)
	x5 1mV/div to 1V/div (1,2,5-step 10 stages)
Sensitivity accuracy	x1 $\pm$ 3 %
rate	x5 $\pm$ 5 %
	Attenuates continuously to 2.5 times or more of the indicated value in each range
Frequency bandwidth (8 div Reference)	x1 DC to 35 MHz ($^{+1}_{-3}$ dB)
	AC 20 Hz to 35 MHz ($^{+1}_{-3}$ dB)
	x5 DC to 7 MHz ($^{+1}_{-3}$ dB)
	AC 20 Hz to 7 MHz ($^{+1}_{-3}$ dB)
Rise time	x1 Approx. less than 10 ns
	x5 Approx. less than 50 ns
Signal delay time	Possible to observe the rising edge
Over shoot	x1 $\pm$ 3 % (at 100 kHz)
	x5 $\pm$ 5 % (at 100 kHz)
Input impedance	Direct 1 MΩ, approx. 30 pF

Maximum input voltage	Direct 500 Vp-p or 300 V (DC + AC peak at 1 kHz) When using probe (DC + AC peak at 1 kHz)
Input coupling	AC-GND-DC
Magnifying function	x5 is possible
Operation mode	CH1, CH2, DUAL, ADD, DIFF
Dynamic range	more than 8 div.
o Horizontal deflection	
Sweep mode	AUTO, NORM, TV(+), TV(-)
Sweep time	0.2 μs/div-0.2s/div (1-, 2-, 5-step 19 stages)
Maximum sweep time	20 ns (at MAG x10)
Sweep variable	2.5 times or more
Sweep time accuracy	$\pm$3 % (at x1) $\pm$5 % (at x10 MAG)
Sweep magnification	x10
Time linearity	$\pm$3 % (at x1) $\pm$5 % (at x10 MAG)
Position adjustment	Possible
o Triggering	
Coupling	AC
Triggering polarity	+, -

Triggering sensitivity and frequency	Frequency	Internal	External
	20Hz-5MHz	0.5-div	200 mV
	5MHz-35MHz	1.5-div	800 mV

TV-V sensitivity	SYNC section more than 1 div or 1 V
External trigger input impedance	Approx. 1 MΩ, approx. 30 pF
Maximum input voltage	Direct 300 V (DC + AC peak at 1 kHz) At using x10 probe 600 V (DC + AC peak at 1 kHz)

o Z-AXIS brightness modulation

Voltage	Brightness is reduced with a positive signal of +5 V or more
Frequency bandwidth	DC to 2 MHz
Input impedance	Approx. 47 Ωk
Maximum input voltage	30 V (DC + AC peak)
CH1 Output	
Output voltage*	20 mV/div Min.
Bandwidth*	50 Hz-5 MHz (-3 dB) (at x1 GAIN)
Output noise*	10 mVp-p Max.

* Measured by 1 m 50-ohm BNC cable with 50-ohm terminator.

Output impedance	Approx. 50 Ω
Output coupling	AC

o X-Y operation

X input	CH1
Y input	CH2
Sensitivity	Same as vertical axis
X frequency bandwidth	DC to 500 kHz (-3 dB)
Phase shift	Within 3 ° (DC to 50 kHz)

o Calibrator

Waveform	1 kHz square wave, within ±10 % (Typical)
Voltage	0.5 V ± 3 %

o CRT

CRT	140DFB31 (5.5, square with internal graph)
Acceleration voltage	Approx. 5.2 kV
Screen area	8 div x10 div, 1 div=9.4 mm
Trace rotation	Present
Scale illumination	Variable edge lighting

Power supply

VOLTAGE	FUSE
100 V (90-110 V)	2A
120 V (108-132 V)	2A
220 V (198-242 V)	1A
240 V (216-264 V)	1A

Power supply frequency 50, 60 Hz

Power consumption Approx. 45 W

o Environment

Rated range of use: +10 to +35 °C

Limit of operation: 0 to +40 °C

Storage and transport: -20 to +70 °C

Operating ambient humidity: 35 to 85 %

o Construction

Dimensions Approx. 275(W) x 190(H) x 400(D)(mm)
(Dimensions of cabinet)

Weight Approx. 8.5 kg

2. COMPOSITION

Composition of Model V-202F/V-203F and V-352F/V-353F oscilloscopes are as follows.

V-202F

(1) Model V-202F oscilloscope unit 1
(2) Probe (AT-10 AF 1.5) 2
(3) Power supply cord 1
(4) Operation Manual 1

V-203F

(1) Model V-203F oscilloscope unit 1
(2) Probe (AT-10 AF 1.5) 2
(3) Power supply cord 1
(4) Operation Manual 1

V-352F

(1) Model V-352F oscilloscope unit 1
(2) Probe (AT-10 AF 1.5) 2
(3) Power supply cord 1
(4) Operation Manual 1

V-353F

(1) Model V-353F oscilloscope unit 1
(2) Probe (AT-10 AF 1.5) 2
(3) Power supply cord 1
(4) Operation Manual 1

3. PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can Prevent instrument breakdown and may improve the reliability of the oscilloscope. The severity of environment to which this instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is preceding recalibration of the instrument.

Disassembly

Remove the 5 screws in the top cover of the instrument. Gently separate the top cover from the instrument and lay aside. Most of the internal parts of the instrument are now accessible.

If access to the front of the Input circuit board is necessary, remove the knobs from all of the external control shaft. Remove the two screws securing the side panel to the Input circuit board and remove the instrument side panel. (See 8. Exploded View)

Cleaning

The instrument should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause component breakdown. The covers provide protection against dust in the interior of the instrument. Loose dust accumulated on these covers can be removed with a soft cloth or small brush.

Dirt that remains can be removed with a soft cloth dampened in a mild detergent and water solution. Abrasive cleaners should not be used. Cleaning the interior should only be occasionally necessary.

The best way to clean the interior is to blow off the dust with a dry, low-velocity stream of air. A soft-bristle brush or a cotton-tipped applicator is useful for cleaning in narrow spaces or for cleaning more delicate components.

Visual Inspection

The instrument should be inspected occasionally for such defects as broken connections, improperly seated transistors, damaged circuit boards, and

heat-damaged parts. The corrective procedure for most visible defects is apparant; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, correcting the cause of the overheating is important to prevent recurrance of the damage.

4. CALIBRATION

Hitachi Denshi, Ltd. provides complete instrument repair and recalibration at out oversea's office, and authorized dealer. Contact your local Hitachi Denshi, Ltd. office or representative.

4. 1 Test equipment required

The following test equipment and accessories, or equivalent, are required for the complete calibration of the V-202F/V-203F, V-352F/V-353F. The given specifications for the test equipment are the minimum necessary for accurate calibration. Therefore, the specifications of any test equipment used must meet or exceed the listed specifications. All the test equipment is assumed to be correctly calibrated and operating within the listed specification, operating instructions for the test equipment are not given in this procedure. Refer to the instruction manual for the test equipment if more information is needed.

Table 4-1

TEST EQUIPMENT REQUIRED

Description	Minimum Specification	Usage	Examples of Applicable Test Equipment
1. Constant Amplitude Signal Generator	50kHz reference frequency; maximum frequency 50MHz; variable amplitude	Check horizontal, vertical and trigger bandwidth.	
2. Standard Amplitude Calibrator	Amplitude accuracy: 0.25%, variable amplitude; 5mV to 40V; frequency: 1kHz square wave	Check horizontal and vertical gain.	
3. Square-wave Generator	Variable frequency; 10Hz to 1MHz; output amplitude; 10mV to 100V	Check probe and vertical compensation.	
4. Digital Multimeter	0.1% accuracy	Check power supply.	
5. Time Mark Generator	0.1% accuracy	Check horizontal timing.	
6. Cable	Impedance, 50 ohms; type, RG-58/U; length, 42 inches, connectors, BNC.	External trigger operation check. Horizontal gain check and adjustment.	Hitachi Part No.4202
7. Termination	Impedance, 50 ohms; connectors, BNC.	Vertical Amplifier compensation checks and adjustment.	
8. Attenuator	Ratio, 10x; connectors, BNC; impedance, 50 ohms	Vertical Amplifier bandwidth check.	
9. T-Connector	Connectors, BNC.	External trigger operation checks.	Hitachi Part No.1301

4. 2 Preliminary procedure

This instrument should be calibrated at an ambient temperature of +20 °C (±5 °C) for best overall accuracy.

1. Connect the instrument to AC line voltage, 50/60 Hz line source.
2. Set the instrument controls as given in the Preliminary Control Settings. Allow at least fifteen minutes of warmup before proceeding.
3. See the Adjustment Locations in the pull-outs.

4. 3 Preliminary control setting

Preset the instrument controls to the settings given below, when starting the calibration procedures.

Table 4-2
PRELIMINARY CONTROL SETTING

	V-202F/203F	V-352F/353F
FOCUS	Midposition	Midposition
TRACE ROTATION	Midposition	Midposition
V.POSITION	Midposition, push in	Midposition, push in
V.VARIABLE	CAL, fully clockwise	CAL, fully clockwise
AC-GND-DC	GND	GND
VOLTS/DIV		
V.MODE	CH1	CH1
TIME/DIV	1ms	1ms
SWP VAR	CAL, fully clockwise	CAL, fully clockwise
H.POSITION	Midposition, push in	Midposition, push in
Trig. LEVEL	Midposition, push in	Midposition, push in
Trig. MODE	AUTO	AUTO
Trig. SOURCE	CH1	CH1

4. 4 Initial starting procedure

1. Rotate POWER/INTENSITY control to the midposition.
2. Wait a few seconds for the cathode ray tube (CRT) to warm up. A trace should appear on the face of the CRT.
3. If no trace appears, increase (clockwise) the POWER/INTENSITY control setting until the trace is easily observed.
4. Adjust FOCUS control for the thinnest, sharpest trace.
5. Readjust POSITION controls if necessary, to center the trace.

POWER SUPPLY SYSTEM

NOTE

Before you begin, see ADJUSTMENT LOCATIONS in the pullout pages.

Control Settings

Preset the controls as given in the Preliminary Control Setting.

(1) Check Low-voltage Supply, if necessary.

a. Connect the digital voltmeter (DVM) from the +5 volt line.

:+5 V ±0.2 V (IC1131)

b. Connect the DVM from the +12 V line.

:+12 V ±0.5 V (IC1111)

c. Connect the DVM from the -12 V line.

:-12 V ±0.5 V (IC1121)

d. Connect the DVM from the +150V/+100V

:+150 V $^{+16V}_{-2V}$ V-202F/203F

:+100 V $^{+11V}_{-5V}$ V-352F/353F

(2) Check High Voltage Supply.

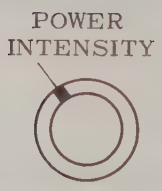
a. Connect the DVM to the H.V test point.

b. Check for a reading of -1900 V ±100 V V-202F/203F

-1350 V ±70 V V-352F/353F

(3) Check/Adjust Grid Bias.

a. Rotate the POWER/INTENSITY to the 1/3 of fully way as shown.



b. Observe the trace of CRT.

c. Adjust Grid Bias Adjustment RV1021 for the trace makes an appear.

DISPLAY

Control Setting

Preset the controls as given in the Preliminary Control Setting.

④ Check/Adjust ASTIGmatism and FOCUS.

a. Set the TIME/DIV switch to the X-Y position, and Vertical MODE switch to the CH2/ X-Y position.

b. Set the POWER/INTENSITY control for a small spot, near center of screen using position controls.

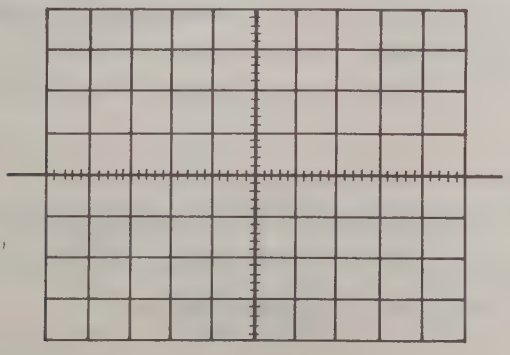
c. Check that the spot is round.

d. Adjust the FOCUS adjustment and the ASTIG adjustment RV1035 for a round spot.

⑤ Check/Adjust Trace Rotation.

a. Set the TIME/DIV switch to 1ms.

b. Check that the trace is parallel to the center horizontal line.



c. Adjust TRACE ROTATION for a trace that is parallel with the horizontal graticule lines.

⑥ Check/Adjust GEOMetry.

a. Set the TIME-DIV switch to the 1ms, and AC-GND-DC switch to DC.

b. Connect the Constant Amplitude Signal Generator to the input.

c. Set the VOLTS/DIV switch setting for a full-screen (8 division) deflection.

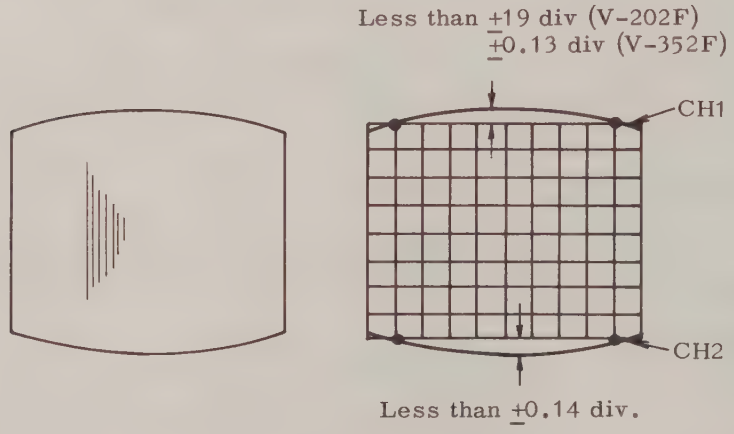
d. Check that horizontal bowing is less than ±0.19 division, V-202F/203F, ±0.13 division (V-352F/353F)

e. Adjust the GEOM adjustment RV1034 for a display that is parallel with top and bottom horizontal lines.

NOTE;

Also it is possible the adjustment of GEOM as follow.

a. Set the vertical MODE to the DUAL.



b. Rotate the POSITION (CH1) control to the top the trace.

c. Rotate the POSITION (CH2) control to the bottom the trace.

d. Check and Adjust as before method.

Control Setting

Preset the controls as given in the Preliminary Control Settings.

⑦ Check/Adjust DC Balance (Step attenuator balance).

a. Set the VOLTS/DIV switch to the 5 mV position.

b. Position the trace to the horizontal center line.

c. Change the VOLTS/DIV switch to the 10 mV position.

d. Check that the trace is within 0.1 division of the center horizontal line.

e. Adjust the DC BAL adjustment, RV19 (CH1) or RV119 (CH2), for a trace at the horizontal center line.

f. Repeat part (a) through (e) until less than 0.05 division shift is noted when changing the VOLTS/DIV setting.

⑧ Check/Adjust Vertical Position Center.

a. Confirm the vertical POSITION control at the midposition.

b. Check the trace is within 1 division.

c. Adjust the Position Center adjustment RV54 (CH1), RV154(CH2) for a trace at the horizontal center line.

⑨ Check/Adjust AC GAIN.

a. Set the TIME/DIV switch to the 1 ms position.

b. Set the VOLTS/DIV switch to the 5 mV position.

c. Set the AC-GND-DC switch to DC.

d. Connect the Square-wave Generator (using 1 kHz output range).

e. Adjust the output amplitude of that generator for more than 4 division deflection of screen.

f. Check the high-voltage level of pulse is flat.

g. Adjust the AC GAIN RV32(CH1), RV132(CH2) adjustment for a flat level.

⑩ Check/Adjust Vertical Gain.

a. Set the VOLTS/DIV switch to the 5 mV position and AC-GND-DC switch to DC.

b. Connect the standard amplitude calibrator to the input.

c. Set the standard amplitude calibrator for a 20 mVp-p (4 divisions of display) signal.

d. Check for a display of four divisions.

e. Adjust RV53 (CH1), RV153 (CH2) for a display of 4 divisions within 3 %.

f. Check all the VOLTS/DIV switch settings.

⑪ Check/Adjust CAL terminal (0.5 Vp-p).

a. Set the VOLTS/DIV switch to the 0.1 V position.

b. Connect the CAL to the input.

c. Check for a display of five divisions.

d. Adjust RV1203 for a display of 5 divisions within 3 %.

⑫ Check/Adjust Attenuation Compensation.

a. Set the VOLTS/DIV switch to the 0.1 V position and AC-GND-DC switch to DC.

b. Connect the square-wave generator to the input for a 0.5 V (1 kHz) signal.

c. Check for a square wave that is flat (flat top).

d. Adjust CV5 (CH1), CV105 (CH2) for a square wave that is flat (flat top).

e. Set the VOLTS/DIV switch to the 1 V position.

f. Set the square-wave generator for a 5 V (1 kHz) signal.

g. Check for a square wave that is flat.

h. Adjust CV10 (CH1), CV110 (CH2) for a square wave that is flat.

⑬ Check/Adjust Probe Compensation.

a. Set the VOLTS/DIV switch to the 5 mV position.

b. Connect the square-wave generator to the input. Use a probe AF1.5. (at x10 position)

c. Set the square-wave generator for a 0.2 V signal.

d. Adjust the LEVEL control for a stable display, triggered on the positive excursion of the waveform.

e. Check that positive excursion of the displayed square wave is flat (flat top).

f. Adjust the trimmer capacitance of that probe the display is flat.

g. Set the VOLTS/DIV switch to the 0.1 V position.

h. Set the square-wave generator for a 5 V signal.

i. Check for a square wave that is flat.

j. Adjust CV4 (CH1), CV104 (CH2) for a square wave that is flat.

k. Set the VOLTS/DIV switch to the 1 V.

l. Set the square-wave generator for a 50 V signal.

m. Check for a square wave that is flat.

n. Adjust CV9 (CH1), CV109 (CH2) for a square wave that is flat.

⑭ Check/Adjust Vertical Step Response.

a. Set the VOLT/DIV switch to the 5 mV position.

b. Set the TIME/DIV switch to the 5 μs position, if necessary, to the 2 μs position setting.

c. Pull the x10 MAG switch out for a magnified display.

d. Connect the first-rise, positive output of the square-wave generator to input. Use a 50-ohm termination and cable.

e. Set the square-wave generator to 100 kHz. Adjust the square-wave generator output for a 4-divisions display.

f. Position the positive-going signal in the center of the graticule, with the top of the square wave visible.

g. Adjust CV334 and CV316 for a square wave that is flat.
(A slight readjustment of the CV316 might be necessary for a flat top with 0 - +8 % over-shoot.)
And adjust CV352, 359 for overshoot that is +0.1 div.

h. Check and adjust CV52 (CH1), CV152 (CH2) for its balanced.

(15) Check/Adjust Vertical Bandwidth.

a. Set the VOLTS/DIV switch to 5 mV, the TIME/DIV switch to 1 ms.

b. Connect the constant amplitude signal generator to the input. Use a 50-ohm termination.

c. Set the constant amplitude signal generator to 50 kHz, and adjust the output amplitude of it for a deflection of eight divisions.

d. Adjust the frequency of the constant amplitude signal generator until 5.6 divisions of deflection are present on the CRT screen.

e. Check that the frequency of the constant amplitude signal generator is greater than 20 MHz (V-202F), 35 MHz (V-352F).

f. Adjust item 14 for deflection of at least 5.6 divisions at 20 MHz (V-202F), 35 MHz (V-352F). Check display for a clean step response.

HORIZONTAL SYSTEM

Control Settings

Preset the controls as given in the Preliminary Control settings.

(16) Check/Adjust Horizontal Gain (Sweep Cal.).

a. Set the TIME/DIV switch to the 1 ms.

b. Set the horizontal gain for a x1 MAG.

c. Set the input AC-GND-DC switch to DC.

d. Connect the cable to the output of the time mark generator.

e. Set the time mark generator for 1 ms time marks.

f. Check that the time marks align with the graticule lines over the center eight divisions.

g. Adjust RV830 at that the time marks align with the center eight graticule lines.

h. Check all other ranges of timing within 3 %. Use appropriate settings on the time mark generator.

i. Set x10 MAG (pull out).

j. Adjust RV831 for one-cycle time marks align with the ten-divisions graticule lines.

k. Check all the TIME/DIV switch settings.

(17) Check/Adjust High speed sweep accuracy.

a. Set the TIME/DIV switch to the 10 μs.

b. Set the horizontal gain for a x1 Mag.

c. Set the time marker for 10 μs.

d. Check that the time marks align with the graticule lines as (16).

e. Adjust CV510.

(18) Check/Adjust X Gain.

a. Set the TIME/DIV switch to [X-Y].

b. Set the AC-GND-DC switch of CH1 to AC, the AC-GND-DC switch of CH2 to GND.

c. Set the VOLTS/DIV switch to the 5 mV position, with x1 GAIN.

d. Connect the standard amplitude calibrator to the CH1 input.

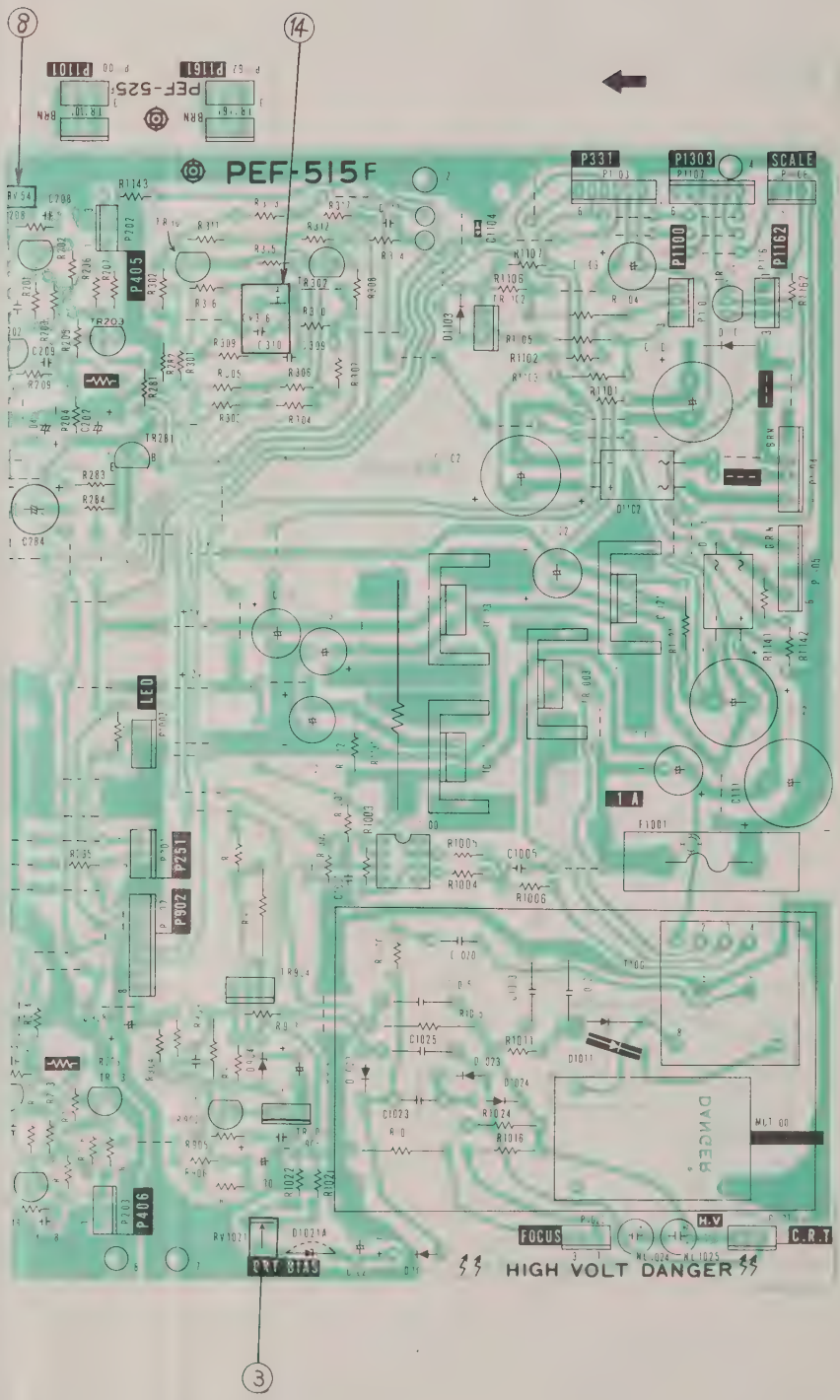
e. Set the standard amplitude calibrator for a 20 mV.

f. Check for a display of 4 divisions.

g. Adjust RV804 for a display of four divisions.

5. ELECTRICAL PARTS ARRANGEMENT
(with Adjustment Locations)

15F PCB


PEF-515F
P331
P1303
SCALE
P1100
P1162
P405
P406
P251
P902
LED
1 A
F1001
FOCUS
H.V
C.R.T
CRT BIAS
HIGH VOLT DANGER
DANGER
8
14
3

16
MAG GAIN
H GAIN
PEF-516 F
EXT BLANKING
INTEN
P802
P801
P905
P1107
ROT. COIL
PEF-516F
PEF-520F
PEF-518F
PEF-521F
PEF-522F
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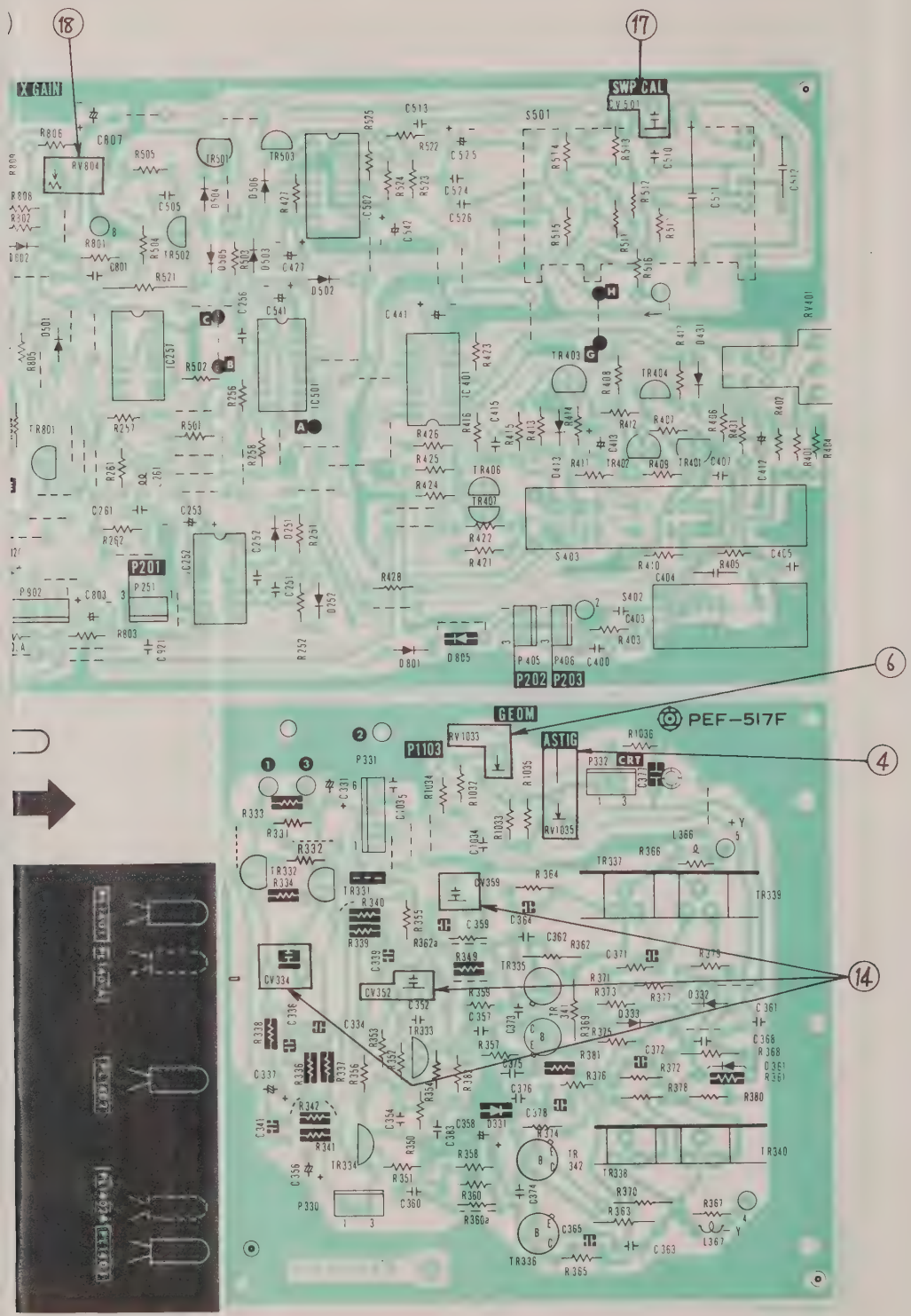
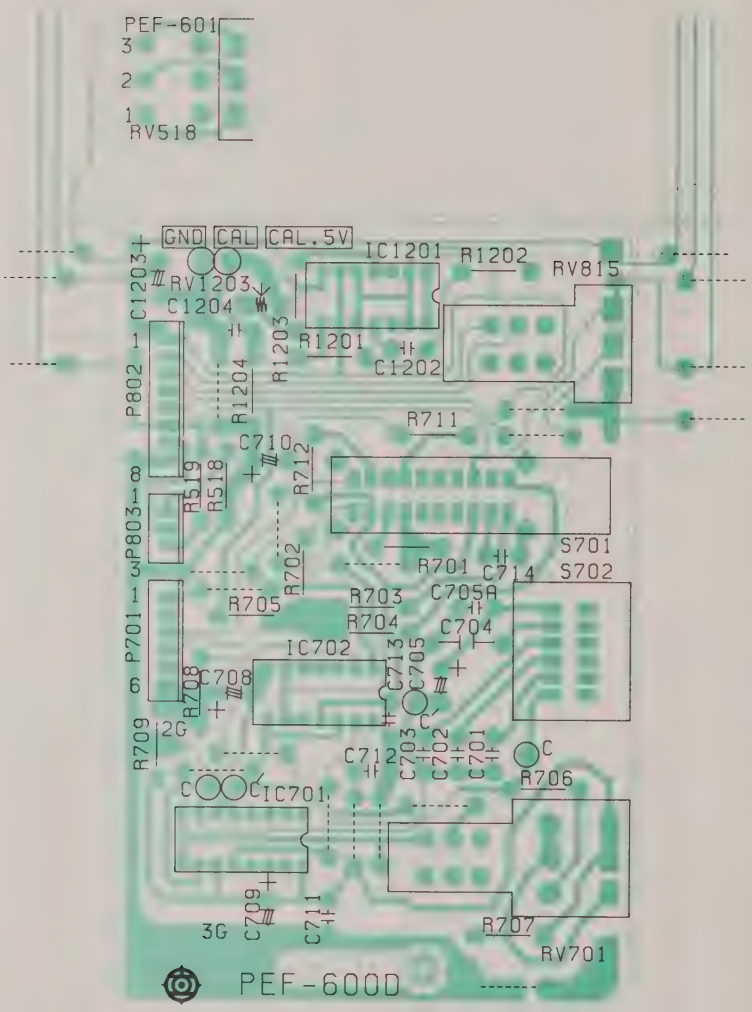
1
2
3
4

'6F PCB


18
17
X GAIN
SWP CAL
S501
P201
P202
P203
6
GEOM
PEF-517F
4
ASTIG
CRT
P1103
14

PEF-600D PCB


PEF-601
3
2
1
RV518
GND
CAL
CAL.5V
IC1201
R1202
RV815
C1203
RV1203
C1204
R1203
R1201
C1202
P802
R1204
R711
C710
R712
R519
R518
P803
R702
R701
C714
S701
S702
R705
R703
C705A
R704
C704
IC702
C713
C705
P701
R708
C708
R709
2G
C712
C703
C702
C701
C
R706
IC701
C709
C711
3G
R707
RV701
PEF-600D

6. ELECTRICAL PARTS LIST

PEF-515F PCB

Part Code	Symbol	Description	Q'ty V-202F	V-352F	203F	353F
CCD0275	C2	C,Ceramic 500V 5 pF ±0.25pF	1	1	1	1
CCC0769	C3	C,Ceramic 500V 5 pF ±0.25pF	1	1	1	1
HX3142155	CV4	C,Variable ECV-1ZW10x93	1	1	1	1
HX3142155	CV5	C,Variable ECV-1ZW10x93	1	1	1	1
CCC1034	C7	C,Ceramic 50V 68 pF ±5%	1	1	1	1
HX3142155	CV9	C,Variable ECV-1ZW10x93	1	1	1	1
CCD0274	C10	C,Ceramic 500V 3 pF ±0.25pF	1	1	1	1
HX3142155	CV10	C,Variable ECV-1ZW10x93	1	1	1	1
CMD0359	C12A	C,Mica DIP-MICA DM15E681J3	1	1	1	1
CCC1004	C12B	C,Ceramic 50V 15 pF ±5%	1	1	1	1
CCC1034	C12C	C,Ceramic 50V 68 pF ±5%	1	1	1	1
CCC1030	C17	C,Ceramic 50V 10000 pF +80% -20%	1	1	1	1
CCC1030	C18	C,Ceramic 50V 10000 pF +80% -20%	1	1	1	1
CCC1029	C19	C,Ceramic 50V 1000 pF +80% -20%	1	1	1	1
CCC0590	C22	C,Ceramic 500V 1000 pF +100-0%	1	1	1	1
CCC1032	C29	C,Ceramic 50V 82 pF ±5%	1	1	1	1
CCC0999	C33	C,Ceramic 50V 5 pF ±0.25pF	1	1	1	1
CEC0175	C36	C,AL Elyc 25V 10μF	1	1	1	1
CEC0032	C37	C,AL Elyc 25V 47μF	1	1	1	1
CEC0175	C38	C,AL Elyc 25V 10μF	1	1	1	1
CCC1004	C39	C,Ceramic 50V 15 pF ±5%	1		1	
CCC1002	C39	C,Ceramic 50V 10 pF ±0.5pF		1		1
CQA0091	C51	C,Plastic 50V 1000 pF ±10%	1		1	
CQA0101	C51	C,Plastic 50V 47000 pF ±10%		1		1
HX3142155	CV52	C,Variable ECV-1ZW 40x93		1		1
CCC1011	C57	C,Ceramic 50V 33 pF ±5%	1	1	1	1
CCC1002	C58	C,Ceramic 50V 10 pF ±0.5pF		1		1
CCC1011	C58	C,Ceramic 50V 33 pF ±5%	1		1	
CCC1029	C65	C,Ceramic 50V 1000 pF +80% -20%	1	1	1	1
CCC0999	C66	C,Ceramic 50V 5 pF ±0.25pF	1	1	1	1
CCD0275	C102	C,Ceramic 500V 5 pF ±0.25pF	1	1	1	1
CCD0275	C103	C,Ceramic 500V 5 pF ±0.25pF		1		1
CCD0279	C103	C,Ceramic 500V 22 pF ±5%	1		1	
HX3142155	CV104	C,Variable ECV-1ZW10x93	1	1	1	1
HX3142155	CV105	C,Variable ECV-1ZW10x93	1	1	1	1
CCC1034	C107	C,Ceramic 50V 68 pF ±5%	1	1	1	1

Part Code	Symbol	Description	Q'ty V-202F	V-352F	203F	353F
HX3142155	CV109	C,Variable ECV-1ZW10x93	1	1	1	1
CCD0275	C110	C,Ceramic 500V 5 pF ±0.25pF	1	1	1	1
HX3142155	CV110	C,Variable ECV-1ZW10x93	1	1	1	1
CMD0359	C112A	C,Mica DIP-MICA DM15E681J3	1	1	1	1
CCC1004	C112B	C,Ceramic 50V 15 pF ±5%	1	1	1	1
CCC1030	C117	C,Ceramic 50V 10000 pF +80% -20%	1	1	1	1
CCC1030	C118	C,Ceramic 50V 10000 pF +80% -20%	1	1	1	1
CCC1029	C119	C,Ceramic 50V 1000 pF +80% -20%	1	1	1	1
CCD0286	C122	C,Ceramic 500V 1000 pF +100-0%	1	1	1	1
CCC1032	C129	C,Ceramic 50V 82 pF ±5%	1	1	1	1
CCC1134	C133	C,Ceramic 50V 6 pF NPO	1		1	
CCC1001	C133	C,Ceramic 50V 8 pF ±0.5pF		1		1
CEC0175	C136	C,AL Elyc 25V 10μF	1	1	1	1
CES0032	C137	C,AL Elyc 25V 47μF	1	1	1	1
CEC0175	C138	C,AL Elyc 25V 10μF	1	1	1	1
CCC1002	C139	C,Ceramic 50V 10 pF ±0.5pF		1		1
CCC1004	C139	C,Ceramic 50V 15 pF ±5%	1		1	
CQA0091	C151	C,Plastic 50V 1000 pF ±10%	1		1	
CQA0101	C151	C,Plastic 50V 47000 pF ±10%		1		1
HX3142155	CV152	C,Variable ECV-1ZW40x93	1	1	1	1
CCC1011	C157	C,Ceramic 50V 33 pF ±5%	1	1	1	1
CCC1011	C158	C,Ceramic 50V 33pF ±5%	1		1	
CCC1002	C158	C,Ceramic 50V 10 pF ±0.5pF		1		1
CCC0999	C166	C,Ceramic 50V 5 pF ±0.25pF	1	1	1	1
CCC1029	C171	C,Ceramic 50V 1000 pF +80% -20%	1	1	1	1
CCC1029	C172	C,Ceramic 50V 1000 pF +80% -20%	1	1	1	1
CCC1004	C201	C,Ceramic 50V 15 pF ±5%	1	1	1	1
CEC0175	C202	C,AL Elyc 25V 10μF	1	1	1	1
CEC0175	C204	C,AL Elyc 25V 10μF	1	1	1	1
CCC1029	C209	C,Ceramic 50V 1000 pF +80% -20%		1		1
CCC1004	C211	C,Ceramic 50V 15 pF ±5%	1	1	1	1
CCC1029	C219	C,Ceramic 50V 1000 pF +80% -20%		1		1
CCC1025	C282	C,Ceramic 50V 100 pF ±10%	1	1	1	1
CEC0161	C284	C,AL Elyc 16V 100μF	1	1	1	1
CCC1162	C309	C,Ceramic 50V 470 pF ±10%	1		1	

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
CCC1034	C309	C,Ceramic 50V 68 pF ±5%		1		1
CCC1004	C310	C,Ceramic 50V 15 pF ±5%		1		1
HX3142155	CV316	C,Variable ECV-1ZW20x93	1		1	
CCC1007	C317	C,Ceramic 50V 22 pF ±5%		1		1
CCC1014	C905	C,Ceramic 50V 47 pF ±5%	1	1	1	1
CEC0175	C907	C,AL Elyc 25V 10μF	1	1	1	1
CCD0272	C909	C,Ceramic 500V 1 pF ±0.25pF			1	
CCD0271	C909	C,Ceramic 500V 0.5 pF ±0.25pF	1	1		1
CEC0175	C908	C,AL Elyc 25V 10μF	1	1	1	1
CEC0219	C912	C,AL Elyc 250V 4.7μF	1	1	1	1
CQA0103	C1001	C,Plastic 50V 0.1μF ±10%	1	1	1	1
CEC0177	C1002	C,AL Elyc 25V 100μF	1	1	1	1
CQA0101	C1005	C,Plastic 50V 47000 pF ±10%	1	1	1	1
CCD0289	C1012	C,Ceramic 2000V 4700 pF ±10%B	1	1	1	1
CCD0289	C1013	C,Ceramic 2000V 4700 pF ±10%B	1	1	1	1
CCC1366	C1015	C,Ceramic 2000V 100 pF ±10%	1	1	1	1
CCD0287	C1020	C,Ceramic 500V 4700 pF +100-0%	1	1	1	1
CEC0213	C1021	C,AL Elyc 160V 1μF	1	1	1	1
CCD0219	C1023	C,Ceramic 2000V 2200 pF ±10%	1	1	1	1
CCD0289	C1025	C,Ceramic 2000V 4700 pF ±10% B	1	1	1	1
CEC0395	C1101	C,AL Elyc 350V 33μF	1	1	1	1
CEC0484	C1102	C,AL Elyc 250V 47μF	1		1	
CEC0340	C1102	C,AL Elyc 160V 100μF		1		1
CEC0219	C1103	C,AL Elyc 250V 4.7μF	1	1	1	1
CCC1030	C1104	C,Ceramic 50V 10000 pF +80% -20%		1		1
CEC0347	C1111	C,AL Elyc 25V 2200μF	1	1	1	1
CES0033	C1112	C,AL Elyc 25V 100μF	1	1	1	1
CEC0347	C1121	C,AL Elyc 25V 2200μF	1	1	1	1
CES0033	C1122	C,AL Elyc 25V 100μF	1	1	1	1
CEC0175	C1131	C,AL Elyc 25V 10μF	1	1	1	1
CES0033	C1132	C,AL Elyc 25V 100μF	1	1	1	1
HTK0011	D1	Transistor 2SK30AY	1	1	1	1
HDH0040	D2	Diode HZ7B	1	1	1	1
HDS0108	D3	Diode 1S2075 T-D	1	1	1	1
HTK0011	D101	Transistor 2SK30AY	1	1	1	1
HDH0040	D102	Diode HZ7B	1	1	1	1
HDS0108	D103	Diode 1S2075 T-D	1	1	1	1
HDS0108	D201	Diode 1S2075 T-D	1	1	1	1
HDS0108	D202	Diode 1S2075 T-D	1	1	1	1
HDS0108	D203	Diode 1S2075 T-D	1	1	1	1
HDS0108	D204	Diode 1S2075 T-D	1	1	1	1
HDS0108	D211	Diode 1S2075 T-D	1	1	1	1

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
HDS0108	D212	Diode 1S2075 T-D	1	1	1	1
HDS0108	D213	Diode 1S2075 T-D	1	1	1	1
HDS0108	D214	Diode 1S2075 T-D	1	1	1	1
HDH0029	D904	Diode HZ5B T-D	1	1	1	1
HDY0031	D1011	Diode Y10GA	1	1	1	1
HDS0250	D1021	Diode 1SS83	1	1	1	1
HDS0250	D1022	Diode 1SS83	1	1	1	1
HDY0031	D1023	Diode Y10GA	1	1	1	1
HDS0250	D1024	Diode 1SS83	1	1	1	1
HDV0022	D1101	Diode V06G	1	1	1	1
HDM0034	D1102	Diode M4G-1	1	1	1	1
HDM0033	D1111	Diode M4C-1	1	1	1	1
HDS0108	D1103	Diode 1S2075 T-D	1	1	1	1
EFG0344	F1001	Fuse MF61NM1 (1A250V)JIS	1	1	1	1
EFH0026	FH1001	Socket, Fus F-3265 1P Phenolic Resin	1	1	1	1
ILT0041	IC1	IC,Analog TL071CP	1	1	1	1
TLT0041	IC101	IC,Analog TL071CP	1	1	1	1
IDH0586	IC201	IC HD74LS74AP	1	1	1	1
ILT0037	IC1001	IC,Analog TL081CP	1	1	1	1
ILM0327	IC1121	IC,Analog MPC7912H	1	1	1	1
HX8338426	IC1111	IC HA17812P	1	1	1	1
HX8338426	IC1131	IC HA17805P	1	1	1	1
HX3142162	MUT1001	Multplier 3.8kV W/Anode Cap		1		1
ELL0019	NL1024	Lamp NE-2	1	1	1	1
ELL0019	NL1025	Lamp NE-2	1	1	1	1
JBX0468	P2	Connector 171825-3	1	1	1	1
JBX0468	P102	Connector 171825-3	1	1	1	1
JBX0468	P201	Connector 171825-3	1	1	1	1
JBX0468	P202	Connector 171825-3	1	1	1	1
JBX0468	P203	Connector 171825-3	1	1	1	1
HX116451	PEF-515	PCB PB-4	1	1	1	1
HX116451	PEF-525	PCB PB-4				
JBX0468	P1002	Connector 171825-3	1	1	1	1
JBX0468	P1021	Connector 171825-3	1	1	1	1
JBX0468	P1022	Connector 171825-3	1	1	1	1
JBX0468	P1101	Connector 171825-3	1	1	1	1
JBX0467	P1102	Connector 171825-8	1	1	1	1
JBX0470	P1103	Connector 171825-6	1	1	1	1
JBX0470	P1104	Connector 171825-6	1	1	1	1
JBX0470	P1105	Connector 171825-6	1	1	1	1
JBX0468	P1106	Connector 171825-3	1	1	1	1
JBX0470	P1107	Connector 171825-6	1	1	1	1
JBX0468	P1161	Connector 171825-3	1	1	1	1
RCR3028	R3	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3040	R5A	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RME0812	R5	R,Metal 1/2W 900kΩ ±0.5%	1	1	1	1
RME0694	R6	R,Metal 1/4W 111kΩ ±0.5%	1	1	1	1
RCR3026	R7	R,Carbon 1/4W 82Ω ±5%	1	1	1	1
RCR3044	R9	R,Carbon 1/4W 470Ω ±5%	1		1	
	R9	R,Carbon 1/4W 10Ω ±5%		1		1
RME0813	R10	R,Metal 1/2W 990kΩ ±0.5%	1	1	1	1
RME0695	R11	R,Metal 1/4W 10.1kΩ ±0.5%	1	1	1	1
RCR3030	R10A	R,Carbon 1/4W 120Ω ±5%	1	1	1	1

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
RCR3003	R12	R,Carbon 1/4W 6.8Ω ±5%	1	1	1	1
RCR3100	R12B	R,Carbon 1/4W 100kΩ ±5%	1	1	1	1
RCR3440	R12C	R,Carbon 1/4W 2.2MΩ ±5%	1	1	1	1
RCR3060	R17	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RME0814	R15	R,Metal 1/2W 800kΩ ±0.5%	1	1	1	1
RME0702	R16	R,Metal 1/4W 200kΩ ±0.5%	1	1	1	1
RCR3028	R18	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RME0677	R19	R,Metal 1/4W 12.1kΩ ±1%	1	1	1	1
HX8348450	RV19	VR,Metal CR29R 10kΩ	1	1	1	1
RCR3074	R20	R,Carbon 1/4W 8.2kΩ ±5%	1	1	1	1
RME0707	R21	R,Metal 1/4W 4.00kΩ ±0.5%	1	1	1	1
RCR3028	R22	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RSE0434	R23	R,Solid 1/2W 10MΩ ±5%	1	1	1	1
RCR3068	R24	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1	1
RCR3028	R25	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3058	R26	R,Carbon 1/4W 1.8kΩ ±5%	1	1	1	1
RCR3074	R26A	R,Carbon 1/4W 8.2kΩ ±5%	1	1	1	1
RME0702	R27	R,Metal 1/4W 200kΩ ±0.5%	1	1	1	1
RME0706	R28	R,Metal 1/4W 46.0kΩ ±0.5%	1	1	1	1
RCR3068	R29	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1	1
RME0648	R30	R,Metal 1/4W 47.5Ω ±1%	1	1	1	1
RME0733	R31	R,Metal 1/4W 412Ω ±1%	1	1	1	1
RCR3044	R32	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
HX8348450	RV32	VR,Metal CR29R 4.7kΩ	1	1	1	1
RME0660	R33	R,Metal 1/4W 475Ω ±1%	1	1	1	1
RCR3050	R34	R,Carbon 1/4W 820Ω ±5%	1	1	1	1
RCR3064	R35	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3004	R36	R,Carbon 1/4W 10Ω ±5%	1	1	1	1
RCR3012	R38	R,Carbon 1/4W 22Ω ±5%	1	1	1	1
RCR3052	R39	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3044	R40	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
HX3142131	RV40	VR,Carbon V16L4-N20KC B 1kΩ	1	1	1	1
RME0708	R41	R,Metal 1/4W 300Ω ±0.5%	1	1	1	1
RME0709	R42	R,Metal 1/4W 150Ω ±0.5%	1	1	1	1
RME0710	R43	R,Metal 1/4W 90.0Ω ±0.5%	1	1	1	1
RME0711	R44	R,Metal 1/4W 60.0Ω ±0.5%	1	1	1	1
RCR3032	R45	R,Carbon 1/4W 150Ω ±5%	1	1	1	1

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
RCR3018	R46	R,Carbon 1/4W 39Ω ±5%	1	1	1	1
RCR3028	R47	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3036	R48	R,Carbon 1/4W 220Ω ±5%		1		1
RCR3040	R48	R,Carbon 1/4W 330Ω ±5%	1		1	
RCR3076	R50	R,Carbon 1/4W 10kΩ ±5%	1	1	1	1
RCR3068	R51	R,Carbon 1/4W 4.7kΩ ±5%	1		1	
RCR3076	R51	R,Carbon 1/4W 10kΩ ±5%		1		1
RCR3036	R52	R,Carbon 1/4W 220Ω ±5%		1		1
RCR3024	R53	R,Carbon 1/4W 68Ω ±5%		1		1
RCR3016	R53	R,Carbon 1/4W 33Ω ±5%	1		1	
HX8348450	RV53	VR,Metal CR29R 100Ω	1	1	1	1
RCR3062	R54	R,Carbon 1/4W 2.7kΩ ±5%	1	1	1	1
HX8348450	RV54	VR,Metal CR29R 2.2kΩ	1	1	1	1
RCR3062	R55	R,Carbon 1/4W 2.7kΩ ±5%	1	1	1	1
RCR3040	R57	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3040	R58	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3028	R59	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3028	R60	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3060	R61	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RDE0013	RV61	VR,Carbon EVH-YK3325B13	1	1	1	1
HX8311705			R	R	R	R
HX8311701			R	R	R	R
RME0727	R62	R,Metal 1/4W 1.15kΩ ±1%	1	1	1	1
RME0727	R63	R,Metal 1/4W 1.15kΩ ±1%	1	1	1	1
RCR3044	R64	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3060	R65	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3020	R66	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3036	R103	R,Carbon 1/4W 220 ±5%	1	1	1	1
RME0812	R105	R,Metal 1/2W 900kΩ ±0.5%	1	1	1	1
RCR3042	R105A	R,Carbon 1/4W 390Ω ±5%	1	1	1	1
RME0694	R106	R,Metal 1/4W 111kΩ ±0.5%	1	1	1	1
RCR3028	R107	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3036	R109	R,Carbon 1/4W 220Ω ±5%	1	1	1	1
RME0813	R110	R,Metal 1/2W 990kΩ ±0.5%	1	1	1	1
RME0695	R111	R,Metal 1/4W 10.1kΩ ±0.5%	1	1	1	1
RCR3028	R110A	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3100	R112B	R,Carbon 1/4W 100kΩ ±5%	1	1	1	1
RME0814	R115	R,Metal 1/2W 800kΩ ±0.5%	1	1	1	1
RME0702	R116	R,Metal 1/4W 200kΩ ±0.5%	1	1	1	1

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
RCR3060	R117	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3028	R118	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RME0677	R119	R,Metal 1/4W 12.1kΩ ±1%	1	1	1	1
HX8348450	RV119	VR,Metal CR29R 10kΩ	1	1	1	1
RCR3074	R120	R,Carbon 1/4W 8.2kΩ ±5%	1	1	1	1
RME0707	R121	R,Metal 1/4W 4.00kΩ ±0.5%	1	1	1	1
RCR3028	R122	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RSE0434	R123	R,Solid	1	1	1	1
RCR3068	R124	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1	1
RCR3028	R125	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3058	R126	R,Carbon 1/4W 1.8kΩ ±5%	1	1	1	1
RCR3074	R126A	R,Carbon 1/4W 8.2kΩ ±5%	1	1	1	1
RME0702	R127	R,Metal 1/4W 200kΩ ±0.5%	1	1	1	1
RME0706	R128	R,Metal 1/4W 46.0kΩ ±0.5%	1	1	1	1
RCR3068	R129	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1	1
RME0648	R130	R,Metal 1/4W 47.5Ω ±1%	1	1	1	1
RME0733	R131	R,Metal 1/4W 412Ω ±1%	1	1	1	1
RCR3044	R132	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RME0660	R133	R,Metal 1/4W 475Ω ±1%	1	1	1	1
HX8348450	RV132	VR,Metal CR29R 4.7kΩ	1	1	1	1
RCR3050	R134	R,Carbon 1/4W 820Ω ±5%	1	1	1	1
RCR3064	R135	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3004	R136	R,Carbon 1/4W 10Ω ±5%	1	1	1	1
RCR3012	R138	R,Carbon 1/4W 22Ω ±5%	1	1	1	1
RCR3052	R139	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3044	R140	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
HX3142131	RV140	RV,Carbon V16L4-N20KC B 1kΩ	1	1	1	1
RME0708	R141	R,Metal 1/4W 300Ω ±0.5%	1	1	1	1
RME0709	R142	R,Metal 1/4W 150Ω ±0.5%	1	1	1	1
RME0710	R143	R,Metal 1/4W 90.0Ω ±0.5%	1	1	1	1
RME0711	R144	R,Metal 1/4W 60.0Ω ±0.5%	1	1	1	1
RCR3032	R145	R,Carbon 1/4W 150Ω ±5%	1	1	1	1
RCR3018	R146	R,Carbon 1/4W 39Ω ±5%	1	1	1	1
RCR3028	R147	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3036	R148	R,Carbon 1/4W 220Ω ±5%		1		1
RCR3040	R148	R,Carbon 1/4W 330Ω ±5%	1		1	
RCR3076	R150	R,Carbon 1/4W 10kΩ ±5%	1	1	1	1

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
RCR3068	R151	R,Carbon 1/4W 4.7kΩ ±5%	1		1	
RCR3076	R151	R,Carbon 1/4W 10kΩ ±5%		1		1
RCR3020	R152	R,Carbon 1/4W 47Ω ±5%		1		1
RCR3032	R152	R,Carbon 1/4W 150Ω ±5%	1		1	
RCR3024	R153	R,Carbon 1/4W 68Ω ±5%		1		1
RCR3016	R153	R,Carbon 1/4W 33Ω ±5%	1		1	
HX8348450	RV153	VR,Metal CR29R 100Ω	1	1	1	1
RCR3062	R154	R,Carbon 1/4W 2.7kΩ ±5%	1	1	1	1
HX8348450	RV154	VR,Metal CR29R 2.2kΩ	1	1	1	1
RCR3062	R155	R,Carbon 1/4W 2.7kΩ ±5%	1	1	1	1
RCR3040	R157	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3040	R158	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3028	R159	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3028	R160	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3060	R161	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RDE0013	RV161	VR,Carbon EVH-Y13K20B13	1	1	1	1
HX8311705			R	R	R	R
HX8311701			R	R	R	R
RME0727	R162	R.Metal 1/4W 1.15kΩ ±1%	1	1	1	1
RME0727	R163	R.Metal 1/4W 1.15kΩ ±1%	1	1	1	1
RCR3020	R166	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3060	R171	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3060	R172	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3044	R173	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3044	R174	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3040	R201	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3061	R202	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1	1
RCR3061	R203	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1	1
RCR3061	R204	R,Carbon 1/4W 2.4kΩ ±5%		1		1
RCR3060	R204	R,Carbon 1/4W 2.2kΩ ±5%	1		1	
RCR3052	R205	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3048	R206	R,Carbon 1/4W 680Ω ±5%	1	1	1	1
RCR3020	R207	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3028	R208	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3036	R209	R,Carbon 1/4W 220Ω ±5%	1	1	1	1
RCR3040	R211	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3061	R212	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1	1
RCR3061	R213	R,Carbon 1/4W 2.4kΩ ±5%	1	1	1	1
RCR3060	R214	R,Carbon 1/4W 2.2kΩ ±5%	1		1	

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
RCR3061	R214	R,Carbon 1/4W 2.4kΩ ±5%		1		1
RCR3052	R215	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3048	R216	R,Carbon 1/4W 680Ω ±5%	1	1	1	1
RCR3020	R217	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3028	R218	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3036	R219	R,Carbon 1/4W 220Ω ±5%	1	1	1	1
RCR3032	R221	R,Carbon 1/4W 150Ω ±5%	1	1	1	1
RCR3032	R222	R,Carbon 1/4W 150Ω ±5%	1	1	1	1
RCR3032	R223	R,Carbon 1/4W 150Ω ±5%	1	1	1	1
RCR3032	R224	R,Carbon 1/4W 150Ω ±5%	1	1	1	1
RCR3038	R231	R,Carbon 1/4W 270Ω ±5%		1		1
RCR3038	R233	R,Carbon 1/4W 270Ω ±5%		1		1
RCR3044	R265	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3040	R301	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3044	R302	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3064	R303	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3064	R304	R,Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3060	R305	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3060	R306	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3040	R307	R,Carbon 1/4W 330Ω ±5%	1	1	1	1
RCR3044	R308	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3092	R309	R,Carbon 1/4W 47kΩ ±5%	1	1	1	1
RCR3072	R310	R,Carbon 1/4W 6.8kΩ ±5%		1		1
RCR3056	R311	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1	1
RCR3056	R312	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1	1
RCR3027	R313	R,Carbon 1/4W 91Ω ±5%	1		1	
RME0796	R313	R,Metal 1/4W 86.6Ω ±1%		1		1
RME0796	R314	R,Metal 1/4W 86.6Ω ±1%		1		1
RCR3027	R314	R,Carbon 1/4W 91Ω ±5%	1		1	
RCR3153	R315	R,Carbon 1/2W 560Ω ±5%	1	1	1	1
RCR3044	R316	R,Carbon 1/4W 470Ω ±5%	1		1	
RCR3072	R316	R,Carbon 1/4W 6.8kΩ ±5%		1		1
RCR3036	R317	R,Carbon 1/4W 220Ω ±5%		1		1
RCR3096	R904	R,Carbon 1/4W 68kΩ ±5%	1	1	1	1
RCR3048	R905	R,Carbon 1/4W 680Ω ±5%	1	1	1	1
RCR3028	R906	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3044	R907	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3060	R908	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
RCR3199	R909	R,Carbon 1/2W 47kΩ ±5%	1	1	1	1
RMR3733	R910	R,Metal 2W 22kΩ ±5%	1		1	
RMR3731	R910	R,Metal 2W 10kΩ ±5%		1		1
RCR3052	R911	R,Carbon 1/4W 1.0kΩ ±5%	1		1	
RCR3050	R911	R,Carbon 1/4W 820Ω ±5%		1		1
RCR3028	R912	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3044	R913	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RME1034	R1001	R,Metal 1/4W 196kΩ ±1%		1		1
RME0818	R1001	R,Metal 1/4W 137kΩ ±1%	1		1	
RCR3052	R1002	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3100	R1003	R,Carbon 1/4W 100kΩ ±5%	1	1	1	1
RCR3052	R1004	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3076	R1005	R,Carbon 1/4W 10kΩ ±5%	1	1	1	1
RCR3036	R1006	R,Carbon 1/4W 220Ω ±5%	1		1	
RCR3044	R1006	R,Carbon 1/4W 470Ω ±5%		1		1
RCR3076	R1011	R,Carbon 1/4W 10kΩ ±5%	1	1	1	1
RMV0004	R1015	R,Metal 1W 22.1MΩ ±1%	1	1	1	1
RCR3476	R1016	R,Carbon 1/2W 1.8MΩ ±5%	1		1	
RCR3480	R1016	R,Carbon 1/2W 2.7MΩ ±5%		1		1
RMV0006	R1017	R,Metal 1/2W 12MΩ ±5%	1		1	
RMV0005	R1017	R,Metal 1/2W 10MΩ ±5%		1		1
RCR3426	R1020	R,Carbon 1/4W 390kΩ ±5%	1	1	1	1
RCR3088	R1021	R,Carbon 1/4W 33kΩ ±5%		1		1
HX8348450	RV1021	VR,Metal 47kΩ CR29R	1	1	1	1
RCR3084	R1021	R,Carbon 1/4W 22kΩ ±5%	1		1	
RCR3068	R1022	R,Carbon 1/4W 4.7kΩ ±5%		1		1
RCR3080	R1022	R,Carbon 1/4W 15kΩ ±5%	1		1	
RMV0004	R1024	R,Solid 1/2W 22.1MΩ ±5%	1	1	1	1
RMR3727	R1103	R,Metal 1W 33kΩ ±5%	1		1	
RMR3730	R1104	R,Metal 2W 3.3kΩ ±5%	1		1	
RMR3729	R1104	R,Metal 2W 1.5kΩ ±5%		1		1
RCR3183	R1105	R,Carbon 1/2W 10kΩ ±5%		1		1
RCR3191	R1105	R,Carbon 1/2W 22kΩ ±5%	1		1	
RME0740	R1106	R,Metal 1/4W 113kΩ ±1%	1		1	
RME0724	R1107	R,Metal 1/4W 20.5kΩ ±1%	1	1	1	1
RCR3004	R1102	R,Carbon 1/4W 10Ω ±5%	1	1	1	1
RMR3726	R1103	R,Metal 1W 22kΩ ±5%		1		1
RME0734	R1106	R,Metal 1/4W 71.5kΩ ±1%		1		1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
RCR3052	R1111	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RMR2837	R1131	R,Metal 5W 47Ω ±5%	1	1	1	1
RCR3104	R1141	R,Carbon 1/4W 470kΩ ±5%	1	1	1	1
RCR3088	R1142	R,Carbon 1/4W 33kΩ ±5%	1	1	1	1
RCR3100	R1143	R,Carbon 1/4W 100kΩ ±5%	1	1	1	1
RCR3004	R1101	R,Carbon 1/4W 10Ω ±5%	1	1	1	1
RMR3723	R1112	R,Metal 1W 100Ω ±5%		1		1
RMR3723	R1121	R,Metal 1W 100Ω ±5%	1	1	1	1
RCR3052	R1162	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
HX8338423	S2	SW,Rotary S21P2310	1	1	1	1
HX8338423	S102	SW,Rotary S21P2310	1	1	1	1
HX324662		Terminal B5	1	1	1	1
SSL0053	S201	SW,Lever SLA245	1	1	1	1
HTK0068	TR1	Transistor 2SK106C	1	1	1	1
HTA0224	TR2	Transistor 2SA1029D	1	1	1	1
HTC0338	TR3	Transistor 2SC1906	1	1	1	1
HTC0338	TR6	Transistor 2SC1906	1	1	1	1
HTC0338	TR7	Transistor 2SC1906	1	1	1	1
HTA0105	TR8	Transistor 2SA836D	1	1	1	1
HTA0105	TR9	Transistor 2SA836D	1	1	1	1
HTK0068	TR101	Transistor 2SK106C	1	1	1	1
HTA0224	TR102	Transistor 2SA1029D	1	1	1	1
HTC0338	TR103	Transistor 2SC1906		1		1
HTC0664	TR103	Transistor 2SC1907	1		1	
HTC0338	TR106	Transistor 2SC1906		1		1
HTC0664	TR106	Transistor 2SC1907	1		1	
HTC0338	TR107	Transistor 2SC1906		1		1
HTC0664	TR107	Transistor 2SC1907	1		1	
HTA0105	TR111	Transistor 2SA836D	1	1	1	1
HTA0105	TR112	Transistor 2SA836D	1	1	1	1
HTA0105	TR113	Transistor 2SA836D	1	1	1	1
HTA0105	TR114	Transistor 2SA836D	1	1	1	1
HTA0099	TR201	Transistor 2SA781K		1		1
HTA0105	TR201	Transistor 2SA836D	1		1	
HTA0105	TR202	Transistor 2SA836D	1		1	
HTA0099	TR202	Transistor 2SA781K		1		1
HTC0148	TR203	Transistor 2SC458C	1		1	
HTC0338	TR203	Transistor 2SC1906		1		1
HTA0099	TR211	Transistor 2SA781K		1		1
HTA0105	TR211	Transistor 2SA836D	1		1	
HTA0105	TR212	Transistor 2SA836D	1		1	
HTA0099	TR212	Transistor 2SA781K		1		1
HTC0148	TR213	Transistor 2SC458C	1		1	
HTC0338	TR213	Transistor 2SC1906		1		1
HTA0224	TR281	Transistor 2SA1029D	1	1	1	1
HTC0338	TR301	Transistor 2SC1906		1		1
HTC0664	TR301	Transistor 2SC1907	1		1	
HTC0338	TR302	Transistor 2SC1906		1		1
HTC0664	TR302	Transistor 2SC1907	1		1	
HTC0148	TR902	Transistor 2SC458C	1	1	1	1
HTC0669	TR903	Transistor 2SC2912S	1	1	1	1
HTC0671	TR904	Transistor 2SC1505L	1	1	1	1
HX3142165	T1001	XFMR D#3142165	1	1	1	1
HTC0032	TR1003	Transistor 2SC1061C	1	1	1	1
HTC0671	TR1101	Transistor 2SC1505L	1	1	1	1
HTC0671	TR1102	Transistor 2SC1505L	1	1	1	1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
HTC0032	TR1161	Transistor 2SC1061C	1	1	1	1
HTC0148	TR1162	Transistor 2SC458C	1	1	1	1

PEF-516F PCB

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
CCC1027	C251	C,Ceramic 50V 220 pF ±10%	1	1	1	1
CQA0091	C252	C,Plastic 50V 1000 pF ±10%	1	1	1	1
CEC0175	C253	C,AL Elyc 25V 10μF	1	1	1	1
CCC1027	C256	C,Ceramic 50V 220 pF ±10%	1	1	1	1
CCC1162	C261	C,Ceramic 50V 470 pF ±10%	1		1	
CCC1027	C261	C,Ceramic 50V 220 pF ±10%		1		1
CCD0278	C403	C,Ceramic 500V 15 pF ±5%	1	1	1	1
CQX0071	C404	C,Plastic 600V 22000 pF ±10%	1	1	1	1
CCC1030	C405	C,Ceramic 50V 10000 pF +80 -20%	1	1	1	1
CCC1030	C400	C,Ceramic 50V 10000 pF +80 -20%	1	1	1	1
CCC1029	C407	C,Ceramic 50V 1000 pF +80 -20%	1	1	1	1
CET0031	C412	C,AL Elyc 50V 1μF NP	1	1	1	1
CES0029	C413	C,AL Elyc 10V 100μF	1	1	1	1
CQA0097	C415	C,Plastic 50V 10000 pF ±10%	1	1	1	1
CEC0175	C427	C,AL Elyc 25V 10μF	1	1	1	1
CEC0175	C441	C,AL Elyc 25V 10μF	1	1	1	1
CCC1011	C505	C,Ceramic 50V 33 pF ±5%	1	1	1	1
CCC1032	C510	C,Ceramic 50V 82 pF ±5%	1	1	1	1
HX3142077	C511,512	C,Plastic 100V 0.01μF ±1%	1	1	1	1
HX3142155	CV510	C,Variable ECV-1ZW40x93	1	1	1	1
CCC1007	C513	C,Ceramic 50V 22 pF ±5%	1	1	1	1
CQA0091	C524	C,Plastic 50V 1000 pF ±10%	1	1	1	1
CEC0175	C525	C,AL Elyc 25V 10μF	1	1	1	1
CQA0103	C526	C,Plastic 50V 0.1μF ±10%	1	1	1	1
CEC0175	C541	C,AL Elyc 25V 10μF	1	1	1	1
CEC0175	C542	C,AL Elyc 25V 10μF	1	1	1	1
CCC1007	C801	C,Ceramic 50V 22 pF ±5%	1		1	
CCC1004	C801	C,Ceramic 50V 15 pF ±5%		1		1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
CEC0213	C803	C, AL Elyc 160V 1μF	1	1	1	1
CEC0175	C807	C, AL Elyc 25V 10μF	1	1	1	1
CCD0287	C828	C, Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCC1162	C832	C, Ceramic 50V 1000 pF +80 -20%	1		1	
CCD0272	C844	C, Ceramic 500V 1 pF ±0.25pF	1		1	1
CCD0272	C845	C, Ceramic 500V 1 pF ±0.25pF	1		1	
CCD0287	C846	C, Ceramic 500V 4700 pF +100-0%		1		1
CCD0287	C847	C, Ceramic 500V 4700 pF +100-0%		1		1
CCC1030	C849	C, Ceramic 50V 10000 pF +80 -20%		1		1
CCD0287	C854	C, Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCD0218	C855	C, Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCC1030	C862	C, Ceramic 50V 10000 pF +80 -20%		1		1
CCC1030	C863	C, Ceramic 50V 10000 pF +80 -20%		1		1
CCC1014	C860	C, Ceramic 50V 47 pF ±5%	1		1	
CCC1025	C860	C, Ceramic 50V 100 pF ±10%		1		1
CCC1030	C901	C, Ceramic 50V 10000 pF +80 -20%	1	1	1	1
HDS0108	D251	Diode 1S2075 T-D	1	1	1	1
HDS0108	D252	Diode 1S2075 T-D	1	1	1	1
HDS0108	D413	Diode 1S2075 T-D	1	1	1	1
HDS0108	D431	Diode 1S2075 T-D	1	1	1	1
HDS0108	D501	Diode 1S2075 T-D	1	1	1	1
HDS0108	D502	Diode 1S2075 T-D	1	1	1	1
HDS0108	D503	Diode 1S2075 T-D	1	1	1	1
HDS0108	D505	Diode 1S2075 T-D	1	1	1	1
HDM0051	D504	Diode MA161	1	1	1	1
HDS0108	D506	Diode 1S2075 T-D	1	1	1	1
HDS0108	D801	Diode 1S2075 T-D	1	1	1	1
HDS0108	D802	Diode 1S2075 T-D	1	1	1	1
HDS0108	D803	Diode 1S2075 T-D	1	1	1	1
HDS0108	D804	Diode 1S2075 T-D		1		1
HDH0024	D805	Diode HZ3B T-D		1		1
HDS0108	D852	Diode 1S2075 T-D		1		1
HDS0108	D853	Diode 1S2075 T-D		1		1
HDS0108	D901	Diode 1S2075 T-D	1	1		
HDS0108	D902	Diode 1S2075 T-D	1	1	1	1
HDS0108	D903	Diode 1S2075 T-D	1	1	1	1
IDH0646	IC251	Digital IC HD74LS02P	1	1	1	1
IDH0179	IC252	Digital IC HD7402P	1	1	1	1
IDH0177	IC401	Digital IC HD7400P	1		1	
IDH0402	IC401	Digital IC HD74S00		1		1
IDH0586	IC501	IC HD74LS74AP	1		1	
IDH0428	IC501	Digital IC HD74S74		1		1
IDH0323	IC502	Digital IC HD74123P	1	1	1	1
TLF0076	L261	Coil FL-7H 101K	1	1	1	1
TLF0148	L854	Coil FL-7H 6.8μH ±5%	1		1	
JBX0468	P251	Connector 171825-3	1	1	1	1
JBX0468	P281	Connector 171825-3	1	1	1	1
JBX0468	P405	Connector 171825-3	1	1	1	1
JBX0468	P406	Connector 171825-3	1	1	1	1
HX116452	PEF-516	PCB PB-5	1	1	1	1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
HX291481			R	R	R	R
JBX0467	P801	Connector 171825-8	1	1	1	1
JBX0468	P905	Connector 171825-3	1	1	1	1
JBX0467	P902	Connector 171825-8	1	1	1	1
RCR3038	R251	R, Carbon 1/4W 270Ω ±5%	1	1	1	1
RCR3060	R252	R, Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3048	R256	R, Carbon 1/4W 680Ω ±5%	1	1	1	1
RCR3086	R257	R, Carbon 1/4W 27kΩ ±5%	1		1	
RCR3080	R257	R, Carbon 1/4W 15kΩ ±5%		1		1
RCR3056	R258	R, Carbon 1/4W 1.5kΩ ±5%	1	1	1	1
RCR3052	R261	R, Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3086	R262	R, Carbon 1/4W 27kΩ ±5%	1	1	1	1
RCR3050	R281	R, Carbon 1/4W 820Ω ±5%	1	1	1	1
RCR3036	R282	R, Carbon 1/4W 220Ω ±5%	1	1	1	1
RCR3052	R283	R, Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3018	R284	R, Carbon 1/4W 39Ω ±5%	1	1	1	1
RCR3082	R401	R, Carbon 1/4W 18kΩ ±5%	1	1	1	1
RCR3098	R402	R, Carbon 1/4W 82kΩ ±5%	1	1	1	1
RCR3104	R403	R, Carbon 1/4W 470kΩ ±5%	1	1	1	1
RCR3060	R404	R, Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RCR3104	R405	R, Carbon 1/4W 470kΩ ±5%	1	1	1	1
RCR3076	R406	R, Carbon 1/4W 10kΩ ±5%	1	1	1	1
RCR3052	R407	R, Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3064	R408	R, Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3052	R409	R, Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3044	R410	R, Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3028	R411	R, Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3092	R412	R, Carbon 1/4W 47kΩ ±5%	1	1	1	1
RCR3064	R413	R, Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3076	R414	R, Carbon 1/4W 10kΩ ±5%	1	1	1	1
RCR3068	R415	R, Carbon 1/4W 4.7kΩ ±5%	1	1	1	1
RCR3086	R416	R, Carbon 1/4W 47kΩ ±5%	1	1	1	1
RCR3064	R417	R, Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3058	R421	R, Carbon 1/4W 1.8kΩ ±5%	1	1	1	1
RCR3064	R422	R, Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3058	R423	R, Carbon 1/4W 1.8kΩ ±5%	1	1	1	1
RCR3028	R424	R, Carbon 1/4W 100Ω ±5%	1	1	1	1
RCR3064	R425	R, Carbon 1/4W 3.3kΩ ±5%	1	1	1	1
RCR3064	R426	R, Carbon 1/4W 3.3kΩ ±5%	1	1	1	1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
RCR3088	R427	R,Carbon 1/4W 33kΩ ±5%	1	1	1	1
RCR3036	R428	R,Carbon 1/4W 220kΩ ±5%	1	1	1	1
RCR3036	R431	R,Carbon 1/4W 220Ω ±5%	1	1	1	1
RDE0003	RV401	VR,Carbon EVH-YK3325B14	1	1	1	1
HX8311705			R	R	R	R
HX8311701			R	R	R	R
RCR3052	R501	R,Carbon 1/4W 1.0kΩ ±5%	1	1	1	1
RCR3044	R502	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RCR3056	R503	R,Carbon 1/4W 1.5kΩ ±5%	1	1		
RCR3046	R503	R,Carbon 1/4W 560Ω ±5%			1	1
RCR3072	R504	R,Carbon 1/4W 6.8kΩ ±5%	1	1	1	1
RCR3044	R505	R,Carbon 1/4W 470Ω ±5%	1	1	1	1
RME0833	R511	R,Metal 1/2W 1.43MΩ ±0.5%	1	1	1	1
RME0834	R512	R,Metal 1/8W 715kΩ ±0.5%	1	1	1	1
RME0699	R513	R,Metal 1/4W 429kΩ ±0.5%	1	1	1	1
RME0718	R514	R,Metal 1/4W 143kΩ ±0.5%	1	1	1	1
RME0717	R515	R,Metal 1/4W 71.5kΩ ±0.5%	1	1	1	1
RME0717	R516	R,Metal 1/4W 71.5kΩ ±5%	1	1	1	1
RME0815	R517	R,Metal 1/4W 28.7kΩ ±0.5%	1	1	1	1
RMR3733	R521	R,Metal 2W 22kΩ ±5%	1		1	
RMR3732	R521	R,Metal 2W 15kΩ ±5%		1		1
RCR3078	R522	R,Carbon 1/4W 12kΩ ±5%	1	1	1	1
RCR3080	R523	R,Carbon 1/4W 15kΩ ±5%	1	1	1	1
RCR3080	R524	R,Carbon 1/4W 15kΩ ±5%	1	1	1	1
RCR3084	R525	R,Carbon 1/4W 22kΩ ±5%	1	1	1	1
RCR3068	R801	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1	1
RCR3076	R802	R,Carbon 1/4W 10kΩ ±5%	1	1	1	1
RCR3094	R803A	R,Carbon 1/4W 56kΩ ±5%		1		1
RCR3094	R803	R,Carbon 1/4W 56kΩ ±5%	1	1	1	1
RCR3420	R803A	R,Carbon 1/4W 180kΩ ±5%	1		1	
RCR3056	R804	R,Carbon 1/4W 1.5kΩ ±5%	1	1	1	1
HX8348450	RV804	VR,Metal CR29R 2.2kΩ	1	1	1	1
RCR3076	R805	R,Carbon 1/4W 10kΩ ±5%		1		1
RCR3072	R805	R,Carbon 1/4W 6.8kΩ ±5%	1		1	
RCR3060	R806	R,Carbon 1/4W 2.2kΩ ±5%		1		1
RCR3066	R806	R,Carbon 1/4W 3.9kΩ ±5%	1		1	
RCR3066	R807	R,Carbon 1/4W 3.9kΩ ±5%		1		1
RME0701	R807	R,Metal 1/4W 5.11kΩ ±1%	1		1	
RCR3060	R808	R,Carbon 1/4W 2.2kΩ ±5%		1		1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
RCR3076	R808	R,Carbon 1/4W 10kΩ ±5%	1		1	
RCR3056	R809	R,Carbon 1/4W 1.5kΩ ±5%	1		1	
RCR3064	R809	R,Carbon 1/4W 3.3kΩ ±5%		1		1
RCR3072	R813	R,Carbon 1/4W 6.8kΩ ±5%		1		1
RCR3074	R813	R,Carbon 1/4W 8.2kΩ ±5%	1		1	
RCR3060	R814	R,Carbon 1/4W 2.2kΩ ±5%	1		1	
RCR3068	R814	R,Carbon 1/4W 4.7kΩ ±5%		1		1
RCR3078	R815	R,Carbon 1/4W 12kΩ ±5%	1	1	1	1
RME0731	R828	R,Metal 1/4W 158kΩ ±1%	1		1	
RME0686	R828	R,Metal 1/4W 68.1kΩ ±1%		1		1
RME0731	R829	R,Metal 1/4W 158kΩ ±1%	1		1	
RME0686	R829	R,Metal 1/4W 68.1kΩ ±1%		1		1
RME0686	R828A	R,Metal 1/4W 68.1kΩ ±1%		1		1
RME0686	R829A	R,Metal 1/4W 68.1kΩ ±1%		1		1
RCR3054	R830	R,Carbon 1/4W 1.2kΩ ±5%	1		1	
RCR3044	R830	R,Carbon 1/4W 470Ω ±5%		1		1
HX8348450	RV830	VR,Metal CR29R 1kΩ	1	1	1	1
RCR3024	R831	R,Carbon 1/4W 68Ω ±5%	1		1	
RCR3016	R831	R,Carbon 1/4W 33Ω ±5%		1		1
HX8348450	RV831	VR,Metal CR29R 220Ω	1		1	
HX8348450	RV831	VR,Metal CR29R 100Ω		1		1
RCR3072	R832	R,Carbon 1/4W 6.8kΩ ±5%	1		1	
RME0729	R842	R,Metal 1/4W 6.19kΩ ±1%	1		1	
RME0729	R843	R,Metal 1/4W 6.19kΩ ±1%	1		1	
RME0819	R842	R,Metal 1/4W 1.91kΩ ±1%		1		1
RME0819	R843	R,Metal 1/4W 1.91kΩ ±1%		1		1
RMR3726	R844	R,Metal 1W 22kΩ ±5%		1		1
RCR3207	R844	R,Carbon 1/2W 100kΩ ±5%	1		1	
RCR3207	R845	R,Carbon 1/2W 100kΩ ±5%	1		1	
RMR3726	R845	R,Metal 1W 22kΩ ±5%		1		1
RCR3052	R846	R,Carbon 1/4W 1.0kΩ ±5%		1		1
RCR3064	R846	R,Carbon 1/4W 3.3kΩ ±5%	1		1	
RCR3064	R847	R,Carbon 1/4W 3.3kΩ ±5%	1		1	
RCR3052	R847	R,Carbon 1/4W 1.0kΩ ±5%		1		1
RCR3102	R848	R,Carbon 1/4W 220kΩ ±5%		1		1
RCR3102	R849	R,Carbon 1/4W 220kΩ ±5%		1		1
RCR3080	R850	R,Carbon 1/4W 15kΩ ±5%		1		1
RCR3080	R851	R,Carbon 1/4W 15kΩ ±5%		1		1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
RCR3052	R852	R,Carbon 1/4W 1.0kΩ ±5%		1		1
RCR3052	R853	R,Carbon 1/4W 1.0kΩ ±5%		1		1
RMR2853	R854	R,Metal 5W 22kΩ ±5%	1		1	
RMR2726	R854	R,Metal 1W 22kΩ ±5%		1		1
RMR2726	R855	R,Metal 1W 22kΩ ±5%		1		1
RMR2853	R855	R,Metal 5W 22kΩ ±5%	1		1	
RCR3028	R856	R,Carbon 1/4W 100Ω ±5%		1		1
RCR3038	R856	R,Carbon 1/4W 270Ω ±5%	1		1	
RCR3038	R857	R,Carbon 1/4W 270Ω ±5%	1		1	
RCR3028	R857	R,Carbon 1/4W 100Ω ±5%		1		1
RCR3004	R859	R,Carbon 1/4W 10Ω ±5%	1	1	1	1
RCR3060	R860	R,Carbon 1/4W 2.2kΩ ±5%	1		1	
RCR3088	R860	R,Carbon 1/4W 33kΩ ±5%		1		1
RCR3004	R861	R,Carbon 1/4W 10Ω ±5%		1		1
RCR3020	R861	R,Carbon 1/4W 47Ω ±5%	1		1	
RCR3020	R862	R,Carbon 1/4W 47Ω ±5%	1		1	
RCR3004	R862	R,Carbon 1/4W 10Ω ±5%		1		1
RCR3040	R863	R,Carbon 1/4W 330Ω ±5%		1		1
RCR3040	R864	R,Carbon 1/4W 330Ω ±5%		1		1
RCR3092	R901	R,Carbon 1/4W 47kΩ ±5%	1	1	1	1
RCR3076	R902	R,Carbon 1/4W 10kΩ ±5%	1	1	1	1
RCR3076	R903	R,Carbon 1/4W 10kΩ ±5%	1	1	1	1
SSL0054	S402	SW,Lever SLA224 Non Short	1	1	1	1
SSL0055	S403	SW,Lever SLA244 Non Short	1	1	1	1
HX8311684	S501	SW,Rotary S21P3520	1	1	1	1
HX8311686			R	R	R	R
HTK0081	TR401	Transistor 2SK304E	1	1	1	1
HTC0148	TR402	Transistor 2SC458C	1	1	1	1
HTA0105	TR403	Transistor 2SA836D	1	1	1	1
HTA0105	TR404	Transistor 2SA836D	1	1	1	1
HTC0338	TR406	Transistor 2SC1906		1		1
HTC0664	TR406	Transistor 2SC1907	1		1	
HTC0338	TR407	Transistor 2SC1906		1		1
HTC0664	TR407	Transistor 2SC1907	1		1	
HTK0081	TR501	Transistor 2SK304E	1	1	1	1
HTC0148	TR502	Transistor 2SC458C	1	1	1	1
HTC0148	TR503	Transistor 2SC458C	1	1	1	1
HTC0148	TR801	Transistor 2SC458C	1	1	1	1
HTA0105	TR802	Transistor 2SA836D	1	1	1	1
HTA0105	TR828	Transistor 2SA836D	1	1	1	1
HTA0105	TR829	Transistor 2SA836D	1	1	1	1
HTA0099	TR846	Transistor 2SA781K		1		1
HTA0099	TR847	Transistor 2SA781K		1		1
HTA0258	TR852	Transistor 2SA1210S		1		1
HTA0258	TR853	Transistor 2SA1210S		1		1
HTC0669	TR856	Transistor 2SC2912S		1		1
HTC0669	TR857	Transistor 2SC2912S		1		1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353
HTC0671	TR856	Transistor 2SC1505L	1		1	
HTC0671	TR857	Transistor 2SC1505L	1		1	
HTA0105	TR846	Transistor 2SA836D	1		1	
HTA0105	TR847	Transistor 2SA836D	1		1	
HTC0148	TR901	Transistor 2SC458C	1	1	1	1

PEF-517F PCB

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
CCC1030	C330	C,Ceramic 50V 10000pF +80% -20%		1		1
CEC0175	C331	C,AL Elyc 25V 10μF	1	1	1	1
CCC1009	C334	C,Ceramic 50V 27pF ±5%		1		1
HX3142155	CV334	C,Variable ECV-1ZW10x93		1		1
CQA0093	C336	C,Plastic 50V 2200pF ±10%		1		1
CEC0175	C337	C,AL Elyc 25V 10μF	1	1	1	1
CCC1029	C339	C,Ceramic 50V 1000pF +80% -20%		1		1
CCC1029	C341	C,Ceramic 50V 1000pF +80% -20%		1		1
CCC1007	C352	C,Ceramic 50V 22pF ±5%	1		1	
HX3142155	CV352	C,Variable ECV-1ZW20x93	1		1	
CCC1002	C354	C,Ceramic 50V 10pF ±0.5pF		1		1
CEC0175	C356	C,AL Elyc 25V 10μF	1	1		
CCC1029	C357	C,Ceramic 50V 1000pF +80% -20%		1		1
CCC1030	C357	C,Ceramic 50V 10000pF +80% -20%	1		1	
CEC0175	C358	C,AL Elyc 25V 10μF	1	1	1	1
CCC0999	C359	C,Ceramic 50V 5pF ±0.25pF		1		1
HX3142155	CV359	C,Variable ECV-1ZW40x93	1		1	
HX3142155	CV359	C,Variable ECV-1ZW40x93		1		1
CCC1004	C360	C,Ceramic 50V 15pF ±5%		1		1
CCC1011	C360	C,Ceramic 50V 33pF ±5%	1		1	
CCC1029	C361	C,Ceramic 50V 1000pF +80% -20%		1		1
CCD0272	C362	C,Ceramic 500V 1pF ±0.25pF		1		1
CCD0273	C362	C,Ceramic 500V 2pF ±0.25pF	1		1	
CCD0272	C363	C,Ceramic 500V 1pF ±0.25pF		1		1
CCD0273	C363	C,Ceramic 500V 2pF ±0.25pF	1		1	

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
CCC1014	C364	C,Ceramic 50V 47 pF ±5%		1		1
CCC1014	C365	C,Ceramic 50V 47 pF ±5%		1		1
CCD0287	C368	C,Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCC1014	C371	C,Ceramic 50V 47 pF ±5%		1		1
CCC1014	C372	C,Ceramic 50V 47 pF ±5%		1		1
CCD0287	C373	C,Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCD0287	C374	C,Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCD0287	C375	C,Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCD0287	C376	C,Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCD0287	C377	C,Ceramic 500V 4700 pF +100-0%		1		1
CCC1029	C378	C,Ceramic 50V 1000 pF +80% -20%		1		1
CCD0287	C1034	C,Ceramic 500V 4700 pF +100-0%	1	1	1	1
CCC1030	C1035	C,Ceramic 50V 10000 pF +80% -20%	1	1	1	1
HDH0040	D331	Diode HZ7B T-D		1		1
HDH0029	D332	Diode HZ5B T-D	1	1	1	1
HDH0040	D333	Diode HZ7B T-D		1		1
HDH0029	D333	Diode HZ5B T-D	1		1	
HDH0029	D361	Diode HZ5B T-D	1		1	
TLF0052	L366	Coil FL-3H 0.47μH ±20%		1		1
TLE0086	L366	Coil EL060R-2R2M	1		1	
TLF0052	L367	Coil FL-3H 0.47μH ±20%		1		1
TLE0086	L367	Coil EL060R-2R2M	1		1	
JBX0468	P330	Connector 171825-3	1		1	
JBX0470	P331	Connector 171825-6	1	1	1	1
JBX0468	P332	Connector 171825-3	1	1	1	1
HX116452	PEF-517	PCB PB-5				
HX291481						
RME0652	R331	R,Metal 1/4W 100Ω ±1%	1	1	1	1
RME0652	R332	R,Metal 1/4W 100Ω ±1%	1	1	1	1
RCR3060	R333	R,Carbon 1/4W 2.2kΩ ±5%				
RME0653	R334	R,Metal 1/4W 121Ω ±1%		1		1
RCR3074	R336	R,Carbon 1/4W 8.2kΩ ±5%		1		1
RME0665	R337	R,Metal 1/4W 1.21kΩ ±1%		1		1
RME0665	R338	R,Metal 1/4W 1.21kΩ ±1%		1		1
RCR3020	R339	R,Carbon 1/4W 47Ω ±5%		1		1
RCR3032	R340	R,Carbon 1/4W 150Ω ±5%		1		1
RCR3020	R341	R,Carbon 1/4W 47Ω ±5%		1		1
RCR3032	R342	R,Carbon 1/4W 150Ω ±5%		1		1
RCR3028	R349	R,Carbon 1/4W 100Ω ±5%		1		1
RME0654	R350	R,Metal 1/4W 150Ω ±1%		1		1
RME0654	R351	R,Metal 1/4W 150Ω ±1%		1		1
RCE3028	R352	R,Carbon 1/4W 100Ω ±5%	1		1	

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
RME0654	R353	R,Metal 1/4W 150Ω ±1%		1		1
RME0651	R353	R,Metal 1/4W 82.5Ω ±1%	1		1	
RCR3076	R354	R,Carbon 1/4W 10kΩ ±5%	1		1	
RCR3052	R354	R,Carbon 1/4W 1kΩ ±5%		1		1
RME0664	R355	R,Metal 1/4W 1.00kΩ ±1%		1		1
RME0816	R355	R,Metal 1/4W 1.27kΩ ±1%	1		1	
RME0816	R356	R,Metal 1/4W 1.27kΩ ±1%	1		1	
RME0664	R356	R,Metal 1/4W 1.00kΩ ±1%		1		1
RME0715	R357	R,Metal 1/4W 274Ω ±1%		1		1
RME0662	R357	R,Metal 1/4W 681Ω ±1%	1		1	
RME0662	R358	R,Metal 1/4W 681Ω ±1%	1		1	
RME0715	R358	R,Metal 1/4W 274Ω ±1%		1		1
RME0662	R359	R,Metal 1/4W 681Ω ±1%	1	1	1	1
RCR3012	R359A	R,Carbon 1/4W 22Ω ±5%	1		1	
RMR0662	R360	R,Metal 1/4W 681Ω ±1%	1	1	1	1
RCR3012	R360A	R,Carbon 1/4W 22Ω ±5%	1		1	
RCR3028	R361	R,Carbon 1/4W 100Ω ±5%		1		1
RMR3724	R362	R,Metal 1W 10kΩ ±5%	1	1	1	1
RMR3724	R363	R,Metal 1W 10kΩ ±5%	1	1	1	1
RCR3020	R364	R,Carbon 1/4W 47Ω ±5%		1		1
RCR3012	R364	R,Carbon 1/4W 22Ω ±5%	1		1	
RCR3012	R365	R,Carbon 1/4W 22Ω ±5%	1		1	
RCR3020	R365	R,Carbon 1/4W 47Ω ±5%		1		1
RCR3040	R366	R,Carbon 1/4W 330Ω ±5%		1		1
RCR3042	R366	R,Carbon 1/4W 390Ω ±5%	1		1	
RCR3042	R367	R,Carbon 1/4W 390Ω ±5%	1		1	
RCR3040	R367	R,Carbon 1/4W 330Ω ±5%		1		1
RCR3191	R368	R,Carbon 1/2W 22kΩ ±5%		1		1
RMR3727	R368	R,Metal 1W 33kΩ ±5%	1		1	
RMR3724	R369	R,Metal 1W 10kΩ ±5%	1		1	
RMR3724	R369	R,Metal 1W 10kΩ ±5%		1		1
RMR3724	R370	R,Metal 1W 10kΩ ±5%		1		1
RMR3724	R370	R,Metal 1W 10kΩ ±5%	1		1	
RCR3012	R371	R,Carbon 1/4W 22Ω ±5%	1		1	
RCR3020	R371	R,Carbon 1/4W 47Ω ±5%		1		1
RCR3020	R372	R,Carbon 1/4W 47Ω ±5%		1		1
RCR3012	R372	R,Carbon 1/4W 22Ω ±5%	1		1	
RCR3060	R373	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
RCR3060	R374	R,Carbon 1/4W 2.2kΩ ±5%	1	1	1	1
RME0655	R375	R,Metal 1/4W 182Ω ±1%		1		1
RME0654	R375	R,Metal 1/4W 150Ω ±1%	1		1	
RME0654	R376	R,Metal 1/4W 150Ω ±1%	1		1	
RME0655	R376	R,Metal 1/4W 182Ω ±1%		1		1
RCR3020	R377	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3020	R378	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3020	R379	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3020	R380	R,Carbon 1/4W 47Ω ±5%	1	1	1	1
RCR3004	R381	R,Carbon 1/4W 10Ω ±5%		1		1
RCR3036	R1032	R,Carbon 1/4W 220Ω ±5%	1	1	1	1
RCR3086	R1033	R,Carbon 1/4W 27kΩ ±5%	1		1	
HX8348450	RV1033	VR,Metal CR29R 47kΩ	1	1	1	1
RCR3096	R1034	R,Carbon 1/4W 68kΩ ±5%	1		1	
RCR3088	R1034	R,Carbon 1/4W 33kΩ ±5%		1		1
HX8348450	RV1035	VR,Metal CR29R 220kΩ	1	1	1	1
RCR3028	R1036	R,Carbon 1/4W 100Ω ±5%		1		1
HTA0099	TR331	Transistor 2SA781K		1		1
HTA0099	TR332	Transistor 2SA781K		1		1
HTC0338	TR333	Transistor 2SC1906		1		1
HTC0664	TR333	Transistor 2SC1907	1		1	
HTC0338	TR334	Transistor 2SC1906		1		1
HTC0664	TR334	Transistor 2SC1907	1		1	
HTC0328	TR335	Transistor 2SC1374H	1	1	1	1
HTC0328	TR336	Transistor 2SC1374H	1	1	1	1
HTC0669	TR337	Transistor 2SC2912S		1		1
HTD0116	TR337	Transistor 2SB718C	1		1	
HTC0669	TR338	Transistor 2SC2912S		1		1
HTD0116	TR338	Transistor 2SB718C	1		1	
HTB0108	TR339	Transistor 2SB718C	1		1	
HTA0258	TR339	Transistor 2SA1210S		1		1
HTB0108	TR340	Transistor 2SB718C	1		1	
HTA0258	TR340	Transistor 2SA1210S		1		1
HTA0088	TR341	Transistor 2SA741H		1		1
HTA0099	TR341	Transistor 2SA781K	1		1	
HTA0099	TR342	Transistor 2SA781K	1		1	
HTA0088	TR342	Transistor 2SA741H		1		1

PEF-518F,524F PCB

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
CQX0071	C1	C,Plastic 600V 22000 pF ±10%	1	1	1	1
CQX0071	C101	C,Plastic 600V 22000 pF ±10%	1	1	1	1
CQA0097	C1202	C,Plastic 50V 10000 pF ±10%	1	1		
CES0033	C1203	C,AL Elyc 25V 100μF	1	1		
CCC1029	C1204	C,Ceramic 50V 1000 pF +80 -20%	1	1		
CEC0175	C1303	C,AL Elyc 25V 10μF	1	1	1	1
CEC0175	C1304	C,AL Elyc 25V 10μF	1	1	1	1
HDH0040	D1301	Diode HZ7B T-D	1	1	1	1
HDH0040	D1302	Diode HZ7B T-D	1	1	1	1
HDS0108	D1303	Diode 1S2075 T-D	1	1	1	1
HDS0108	D1304	Diode 1S2075 T-D	1	1	1	1
IDC0089	IC1201	IC CD4011UBE	1	1		
JSP0001	J1011	Socket PS-085	1	1	1	1
HX116452	PEF-518	PCB PB-5				
HX291481						
HX116452	PEF-519	PCB PB-5				
HX291481	(V-202F) (V-203F)					
HX116452	PEF-520	PCB PB-5	R	R	R	R
HX291481	(V-352F) (V-353F)					
HX116452	PEF-521	PCB PB-5	R	R	R	R
HX291481			R	R	R	R
HX116452	PEF-522	PCB PB-5	R	R	R	R
HX291481			R	R	R	R
HX116452	PEF-523	PCB PB-5	R	R	R	R
HX291481						
HX116452	PEF-524	PCB PB-5	R	R	R	R
HX291481						
JBX0467	P802	Connector 171825-8	1	1		
JBX0468	P1001	Connector 171825-3	1	1	1	1
JBX0470	P1303	Connector 171825-6	1	1	1	1
HX8329332	PL1401A	Lamp Scale Lamp 14V 80mA	1	1	1	1
HX8329332	PL1402A	Lamp Scale Lamp 14V 80mA	1	1	1	1
HX3142131	RV518	VR,Carbon V16L4-N20KC B 2kΩ	1	1		
RCR3050	R518	R,Carbon 1/4W 820Ω ±5%	1	1		
RCR3028	R519	R,Carbon 1/4W 100Ω ±5%	1	1		
RDE0003	RV815	VR,Carbon EVH-YK3325B14	1	1		
HX8311705			R	R		
HX8311701			R	R		
HX8348451	RV1026	VR,Carbon EVH-CCAS15B14 10kΩ	1	1	1	1
RCR3100	R1031	R,Carbon 1/4W 100kΩ ±5%	1	1	1	1
RCR3090	R1201	R,Carbon 1/4W 39kΩ ±5%	1	1		
RCR3092	R1202	R,Carbon 1/4W 47kΩ ±5%	1	1		
HX8348450	RV1203	VR,Metal CR29R 4.7kΩ	1	1		
RCR3080	R1203	R,Carbon 1/4W 15kΩ ±5%	1	1		
RCR3049	R1204	R,Carbon 1/4W 750Ω ±5%	1	1		
HX8348452	RV1303	VR,Carbon EVH-CCAK20B14 10kΩ	1	1		

Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
RCR3068	R1303	R,Carbon 1/4W 4.7kΩ ±5%	1	1	1	1
SSV0042	S1	SW,Slide SSB023 L=9 NS PCB	1	1	1	1
SSV0042	S101	SW,Slide SSB023 L=9 NS PCB	1	1	1	1

CHASSIS

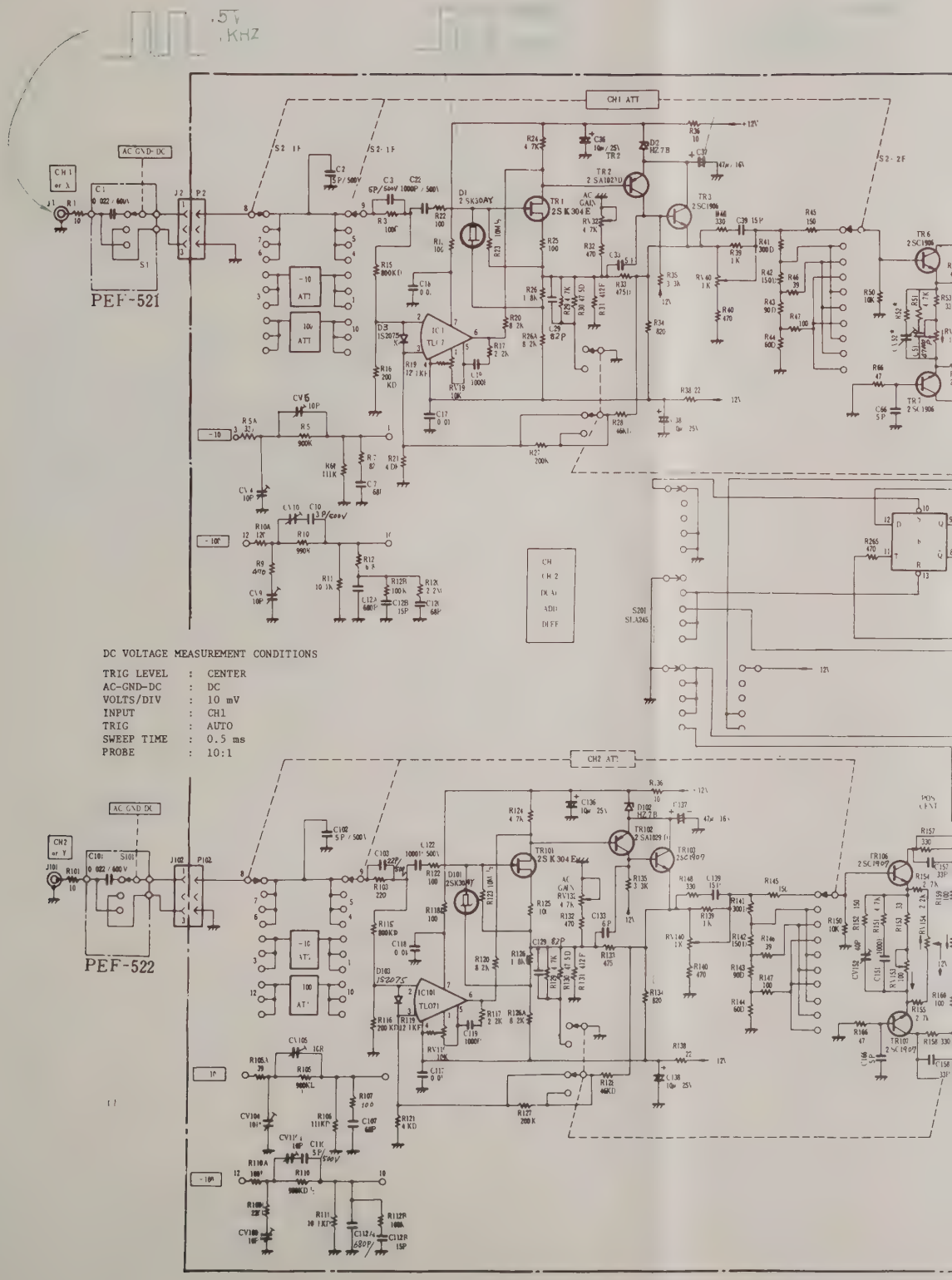
Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
HDS0408	D1111	Diode SR503D (with mount) (RED)	1	1	1	1
HX8311741	DL1301	Delay Line CD-3A		1		1
JHB0088	J1	Coax. Con BNC071	1	1	1	1
JHB0088	J101	Coax. Con BNC071	1	1	1	1
JHB0088	J282	Coax. Con BNC071	1	1	1	1
JHB0088	J401	Coax. Con BNC071	1	1	1	1
HX8338351	J402	Terminal Z-048(Earth)	1	1	1	1
JHB0088	J901	Coax. Con BNC071	1	1	1	1
JJC0026	J1102	Connector CM3 (C-170)	1	1	1	1
HX3142147	J1103	Terminal S-17221 (100/120/220/240V)	1	1	1	1
HX4114183	J1201	Terminal BLK (14V 80μA)	1	1	1	1
ERS0004		HLDR CB-3	1	1	1	1
HX8348453	L1026	Coil Rotation Coil	1	1	1	1
EFG0352	F1101	Fuse MF61NM 2 (2A 250V) JIS	1	1	1	1
EFG0344	F1101	Fuse MF61NM 1 (1A 250V) JIS	(1)	(1)	(1)	(1)
JBX0468	P1100	Connector 171825-3	1	1	1	1
BBZ0182	P1101	Cable,AC VM1165B-1172B A=Japan	1	1	1	1
BBZ0183	P1101	Cable,AC VM0099-0081 C=Europe	(1)	(1)	(1)	(1)
BBZ0184	P1101	Cable,AC VM0033-0076B A=USA,CSA	(1)	(1)	(1)	(1)
BBZ0214	P1101	Cable,AC 0118-0081 S=AUSTRIA	(1)	(1)	(1)	(1)
BBZ0215	P1101	Cable,AC 0113 B=ENGLAND	(1)	(1)	(1)	(1)
HX3142152		Connector Assembly	1		1	
HX3142152		Connector Assembly		1		1
JBX0468	P1162	Connector 171825-3	1	1	1	1
RCR3004	R1	R,Carbon 1/4W 10Ω ±5%	1	1	1	1
RCR3004	R101	R,Carbon 1/4W 10Ω ±5%	1	1	1	1
RCR3028	R400	R,Carbon 1/4W 100Ω ±5%	1	1	1	1
HX3142133	RV1101	VR,Carbon V24L5S(U12DV-C) 20KC-10kΩ	1	1	1	1
RDE0028	RV1016	VR,Carbon EVM-R7GS20B26	1	1	1	1
HX3169422	T1101	XFMR For V-202F, V-352F	1	1	1	1
DPX0063	V1001	CRT 140BMB31R	1		1	
DPX0065	V1001	CRT 140DFB31		1		1
ERL0009		HLDR SKB-3M	1		1	

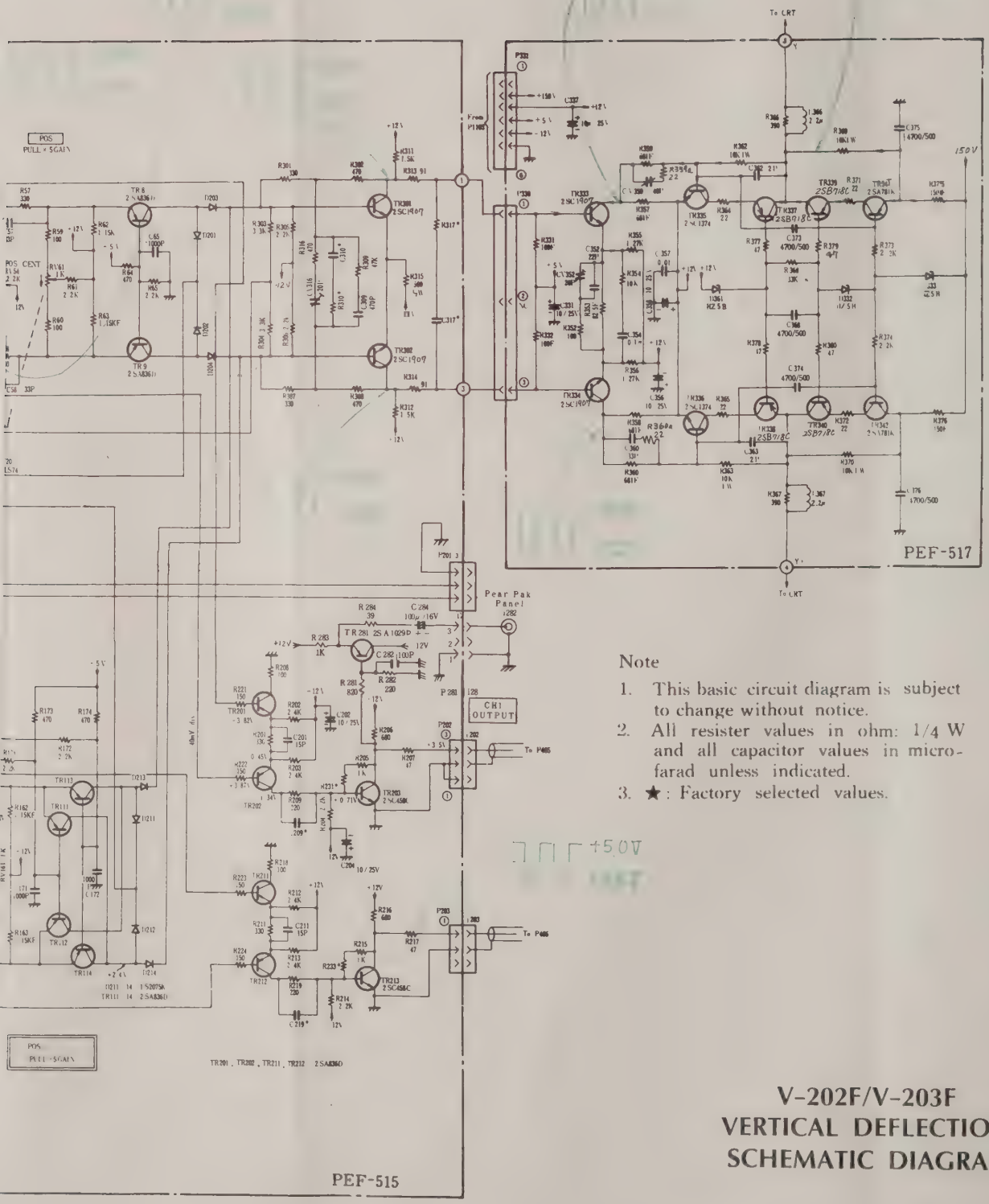
Part Code	Symbol	Description	Q'ty V-202F	V-352F	V-203F	V-353F
ERL0093		HLDR SKB-4M		1		1
JBX0449		Connector 171822-3	1	1	1	1
JYX0252		Contact 170205-1	2	2	2	2
BBA0139		Wire, Vinyl WL1H 7/0.18 BLU	R2	R2	R2	R2
BBA0143		Wire, Vinyl WL1H 7/0.18 YEL	1	1	1	1
BBA0144		Wire, Vinyl WL1H 7/0.18 BLK	R1	R1	R1	R1
BBA0160		Wire, Vinyl WL1H 7/0.18 BRN	R2	R2	R2	R2
BBA0164		Wire, Vinyl WL1H 7/0.18 GRN	R1	R1	R1	R1
ERL0002		Cable Tie Unity 3-35MM	5	8	8	8
BSE0001		Wire DIA 0.75 Tin Plated	R3	R3	R3	R3
ERB0027		Tubing,Vinyl Dia 3.0 CLR		R1		R1
BBA0465		Wire PVC UL1015#22 YEL 1	1	1	1	1
BBA0403		Wire TA-SC UL-1007 #22 WHT	1R5	1R5	1R5	1R5
HX8241078-79	C5	Wire 7/0.18 SN GRN	1	1	1	1
BSB0001		Wire DIA 0.5 Solder Coated	R2	R2	R2	R2
CCC1027VA	C701	C,Ceramic 50V 220pF ±10%			1	1
CQA0093VA	C702	C,Plastic 50V 2200pF ±10%			1	1
CQA0099VA	C703	C,Plasgic 50V 22000pF ±10%			1	1
CQA0110	C704	C,Plastic 50V 0.22μF ±10%			1	1
CES0038VA	C705				1	1
	C705A	Not Used			R	R
CEC0175	C708	C,AL Elyc 25V 10μF			R 1	R 1
CES0033VA	C709				1	1
CEC0175VA	C710	C,AL Elyc 25V 10μF			1	1
CCC1030VA	C711	C,Ceramic 50V 10000pF +80 -20%				
CCC1030VA	C712	C,Ceramic 50V 10000pF +80 -20%				
CCC1029	C713	C,Ceramic 50V 1000pF			1	1
CCC1029VA	C714	C,Ceramic 50V 1000pF +80 -20%			1	1
CQA0097VA	C1202	C,Plastic 50V 10000pF ±10%			1	1
CES0033VA	C1203				1	1
CCC1029VA	C1204	C,Ceramic 50V 1000pF +80 -20%			1	1
IDH0820	IC701	IC,Digital HD74LS123P			1	1
IDH0467	IC702	Digital IC HD74LS00P			1	1
IDC0089	IC1201	IC CD4011UBE			1	1
HX3169414	J701	Connector For Single Time Base Delay			1	1
HX3169414	J803	Connector For Single Time Base Delay			R	R
JBX0470	P701	Connector 171825-6			1	1
JBX0467	P802	Connector 171825-8			1	1
JBX0468	P803	Connector 171825-3			1	1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F
HX119591	PEF-600	PCB PEF-600-601			R2	R2
HX119591	PEF-601	PCB PEF-600-601			R	R
RCR3092HA	R708	R,Carbon 1/4W 47kΩ ±5%			1	1
RCR3028HA	R701	R,Carbon 1/4W 100Ω ±5%			1	1
RCR3062HA	R702	R,Carbon 1/4W 2.7kΩ ±5%			1	1
RCR3084HA	R703	R,Carbon 1/4W 22kΩ ±5%			1	1
RCR3100HA	R704	R,Carbon 1/4W 100kΩ ±5%			1	1
RCR3088HA	R705	R,Carbon 1/4W 33kΩ ±5%			1	1
RCR3068HA	R706	R,Carbon 1/4W 4.7kΩ ±5%			1	1
RCR3105HA	R707	R,Carbon 1/4W 680kΩ ±5%			1	1
RCR3012HA	R709	R,Carbon 1/4W 22Ω ±5%			1	1
RCR3050HA	R711	R,Carbon 1/4W 820Ω ±5%			1	1
RCR3050HA	R712	R,Carbon 1/4W 820Ω ±5%			1	1
RCR3090HA	R1201	R,Carbon 1/4W 39kΩ ±5%			1	1
RCR3092HA	R1202	R,Carbon 1/4W 47kΩ ±5%			1	1
RCR3080HA	R1203	R,Carbon 1/4W 15kΩ ±5%			1	1
RCR3049HA	R1204	R,Carbon 1/4W 750Ω ±5%			1	1
HX8348450	RV1203	VR,Metal CR29R 4.7kΩ			1	1
RCR3050HA	R518	R,Carbon 1/4W 820Ω ±5%			1	1
RCR3028HA	R519	R,Carbon 1/4W 100Ω ±5%			1	1
HX3142131	RV518	VR,Carbon V16L4-N20KC 82kΩ			1	1
RDE0003	RV815	VR,Carbon EVH-YK3325B14			1	1
HX8311705					R	R
HX8311701					R	R
HX3142080	RV701	VR,Carbon RV16 (200kΩB + 20kΩB)			1	1
HX8374067	S701	SW, Lever SLR543			1	1
HX3165210	S702	SW, Rotary SBU 1025			1	1

Part Code	Symbol	Description	Q'ty			
			V-202F	V-352F	V-203F	V-353F

7. SCHEMATIC DIAGRAMS





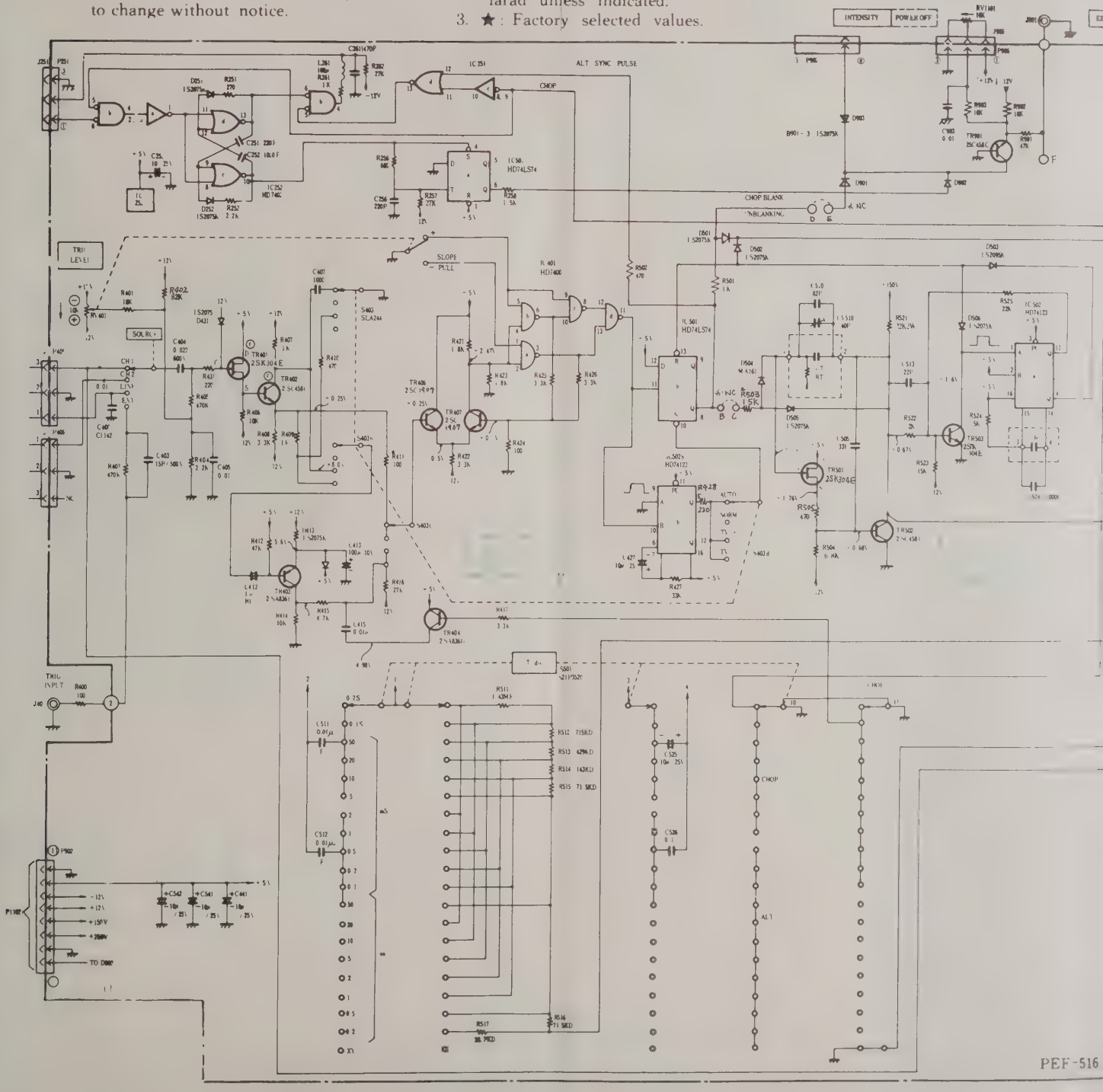
Note

1. This basic circuit diagram is subject to change without notice.
2. All resister values in ohm: 1/4 W and all capacitor values in micro-farad unless indicated.
3. ★: Factory selected values.

V-202F/V-203F VERTICAL DEFLECTION SCHEMATIC DIAGRAM ①

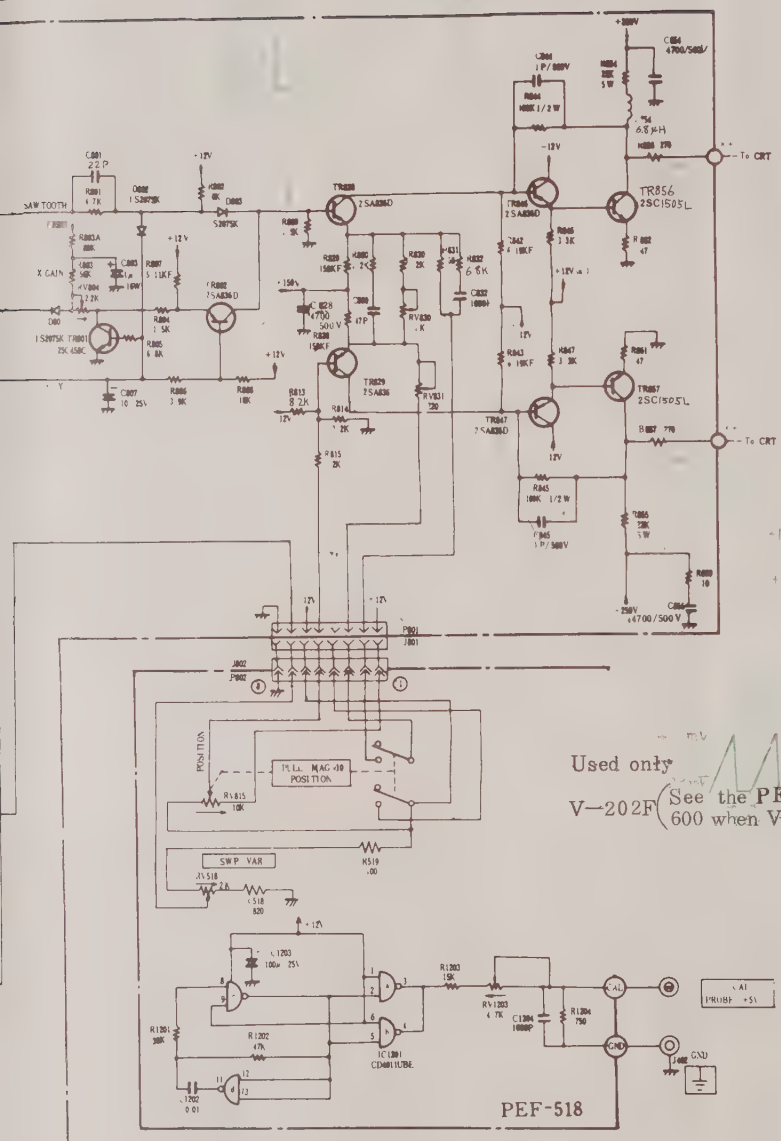
Note

1. This basic circuit diagram is subject to change without notice.
2. All resister values in ohm: 1/4 W and all capacitor values in micro-farad unless indicated.
3. ★: Factory selected values.



*R503 560(When V--203F)

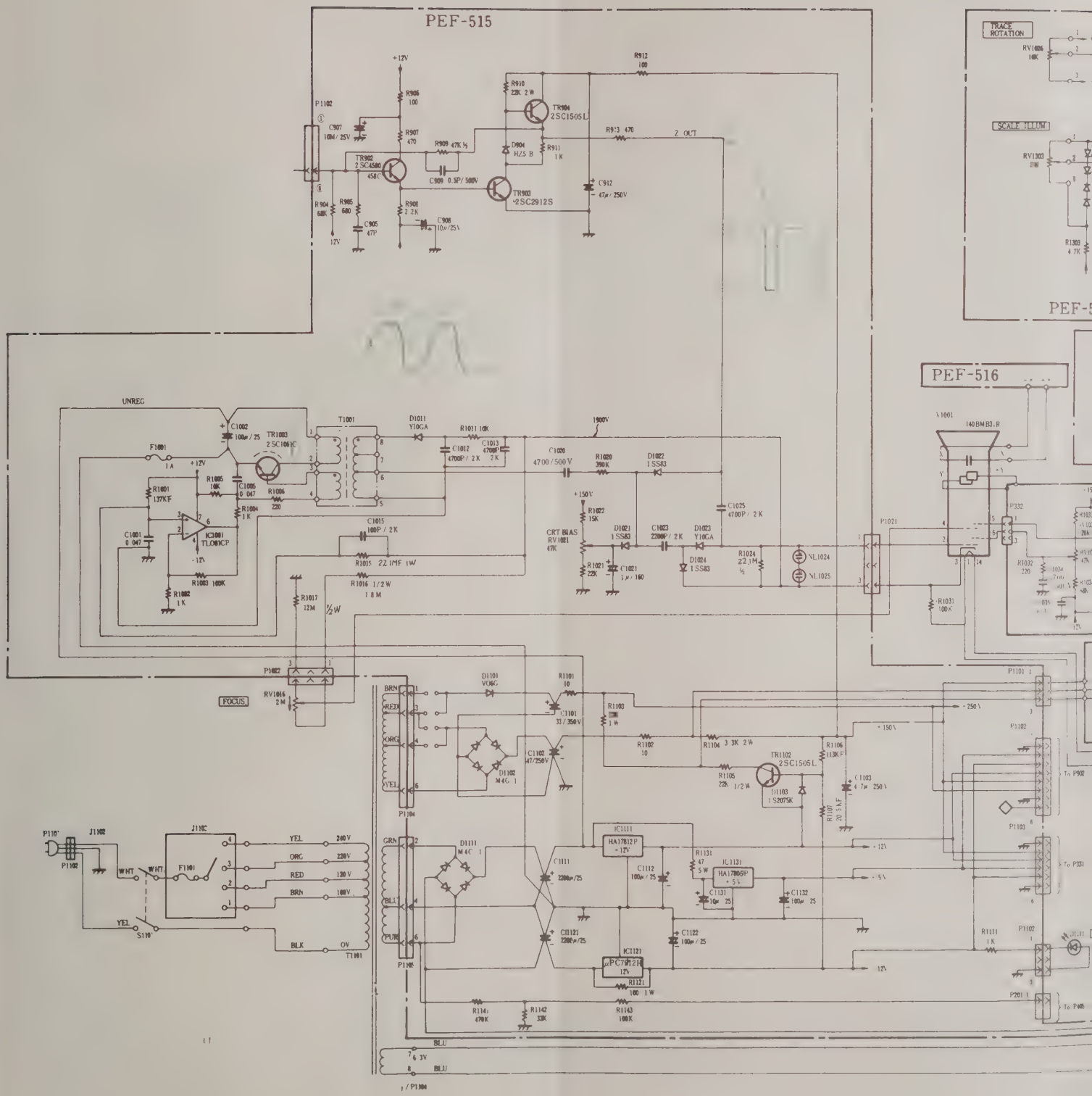
*NC

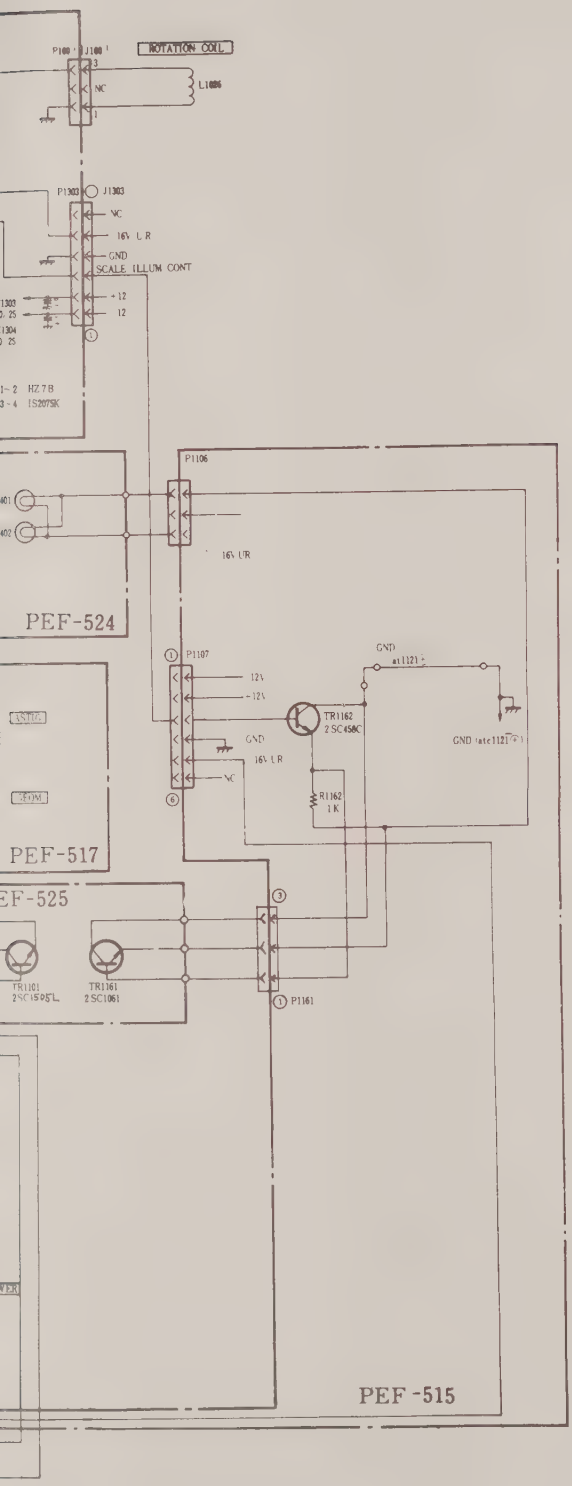


Used only
V—202F (See the PEF-600 when V—203F)

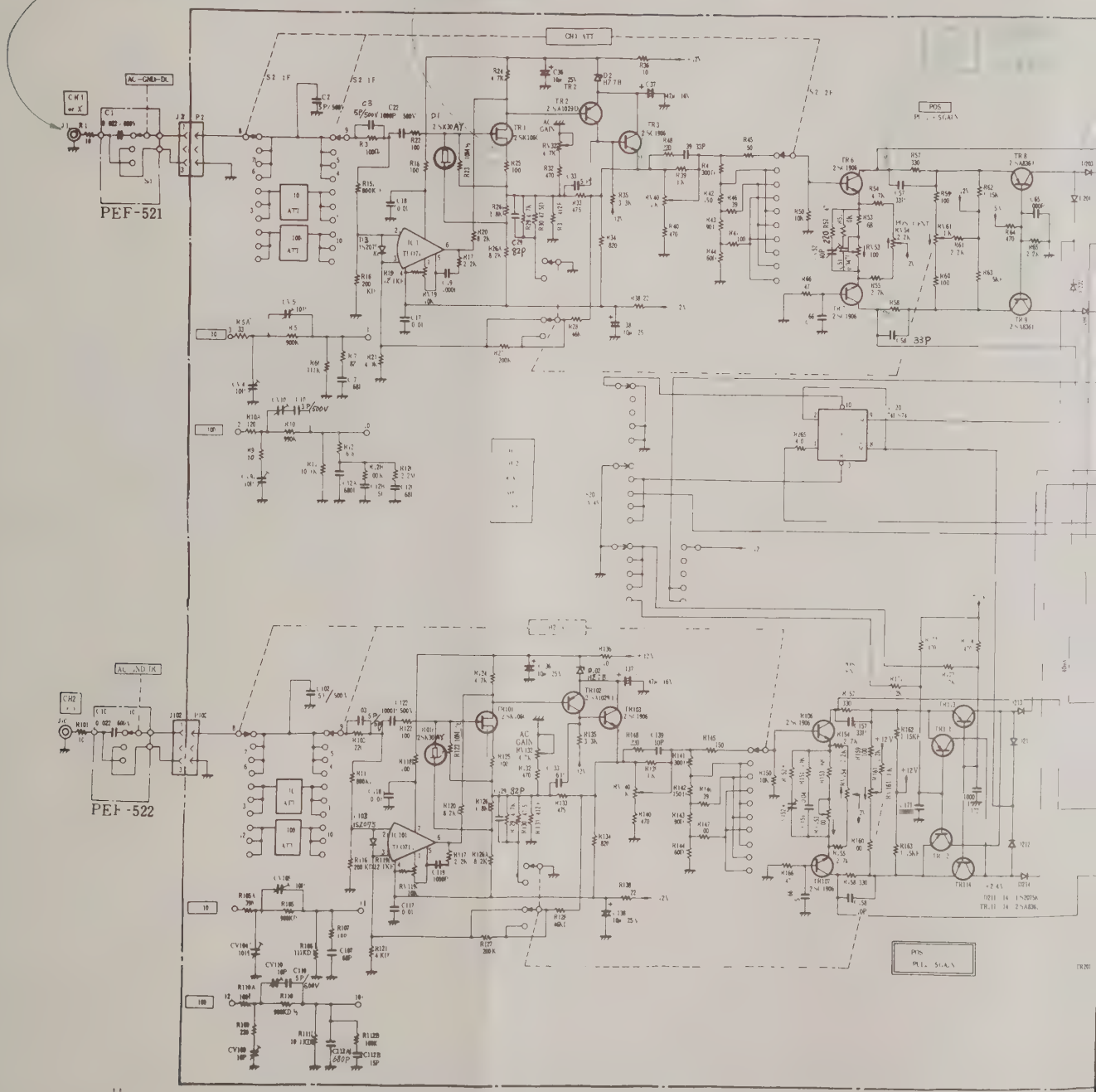
hen V—203F)

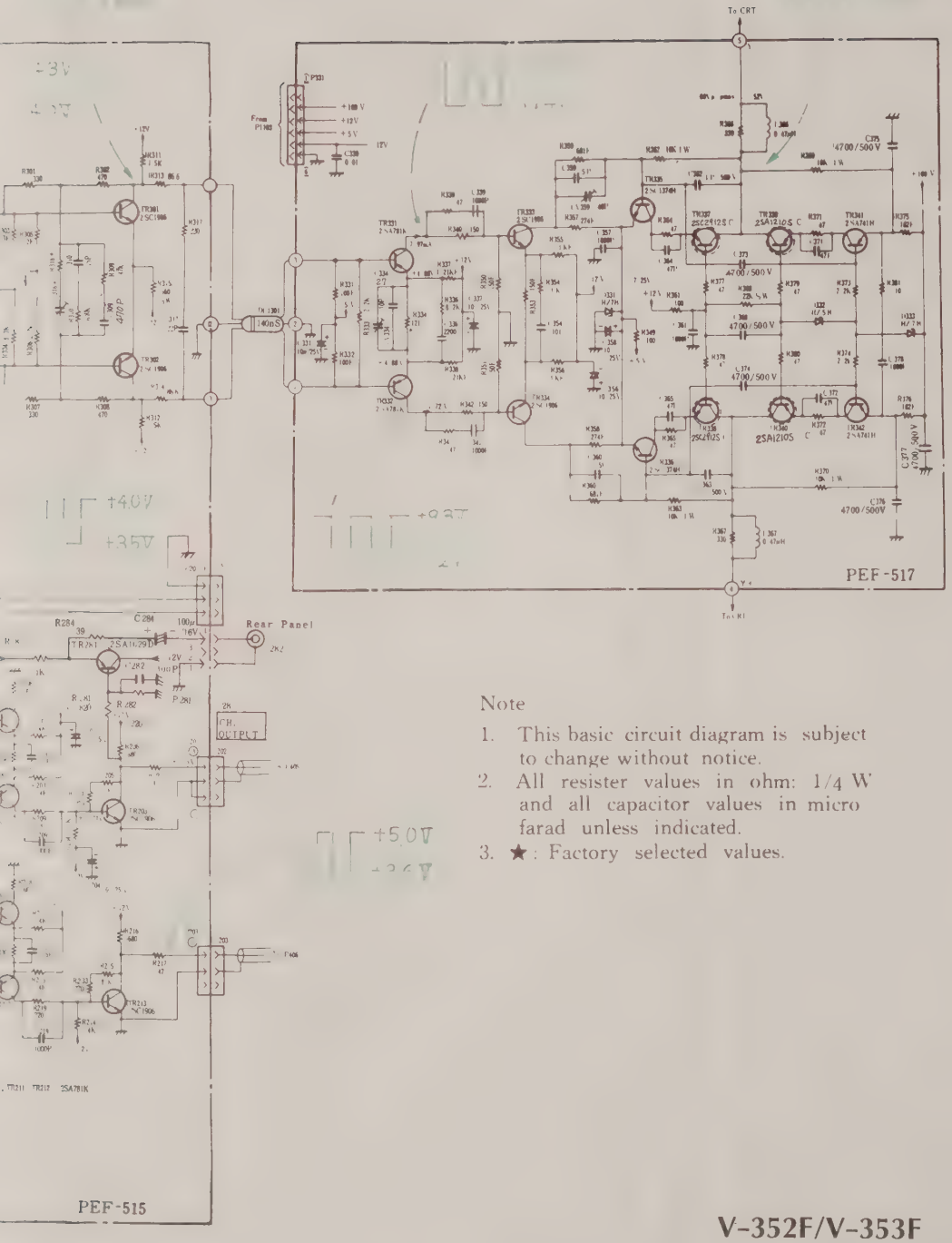
V-202F/V-203F HORIZONTAL DEFLECTION TRIGGERING AND CAL SCHEMATIC DIAGRAM ②


PEF-515
PEF-516
TRACE ROTATION
SCALE ILLUM
UNREG
FOCUS
+12V
-12V
+150V
1900V
Z OUT
CRT BIAS
TR902 2SC458C
TR903 2SC2912S
TR904 2SC1505L
TR1002 2SC1061C
TR1102 2SC1505L
IC1001 TL084CP
IC1101 31/350V
IC1111 HA17812P
IC1121 μPC7912H
IC1131 HA17805P
D1102 M4G 1
D1111 M4G 1
D1103 1S2075K
V1001 140BMB3-R
P1021
P1101
P1102
P1103
P1104
P1105
P1107
P1122
P1332
P1102
P110'
J1102
J110C
F1001
S110'
T1001
YEL 240V
ORG 220V
RED 120V
BRN 100V
BLK 0V
WHT
BLU
GRN
To P902
To P331
To P405



V-202F/V-203F
POWER SUPPLY HIGH VOLTAGE AND CRT CONTROLES
.. SCHEMATIC DIAGRAM ③


PEF-521
PEF-522
CH1 ATT
CH2 ATT
AC-GND-DC
AC GAIN
POS
P.I. SCAN



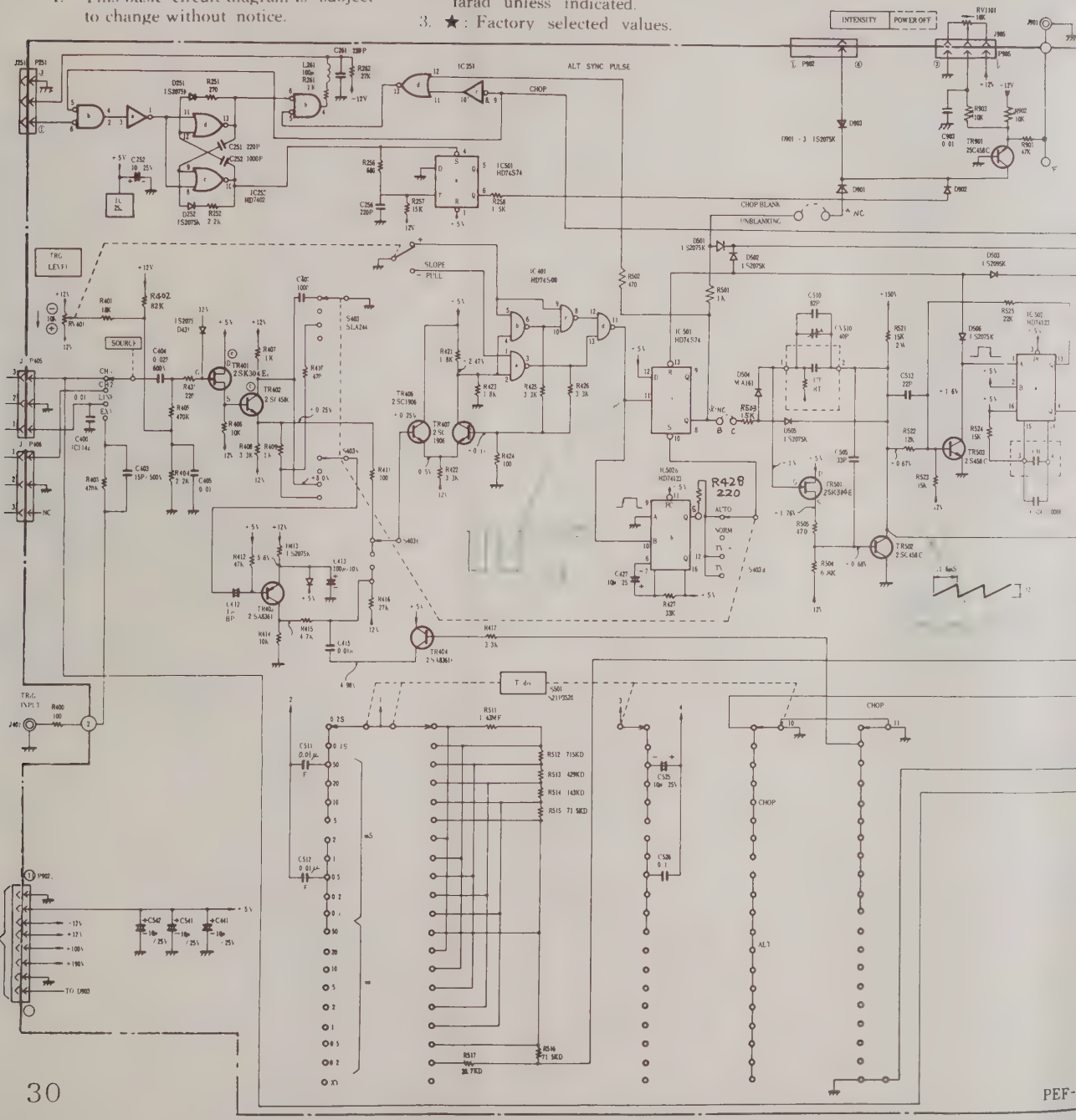
Note

1. This basic circuit diagram is subject to change without notice.
2. All resister values in ohm: 1/4 W and all capacitor values in micro farad unless indicated.
3. ★: Factory selected values.

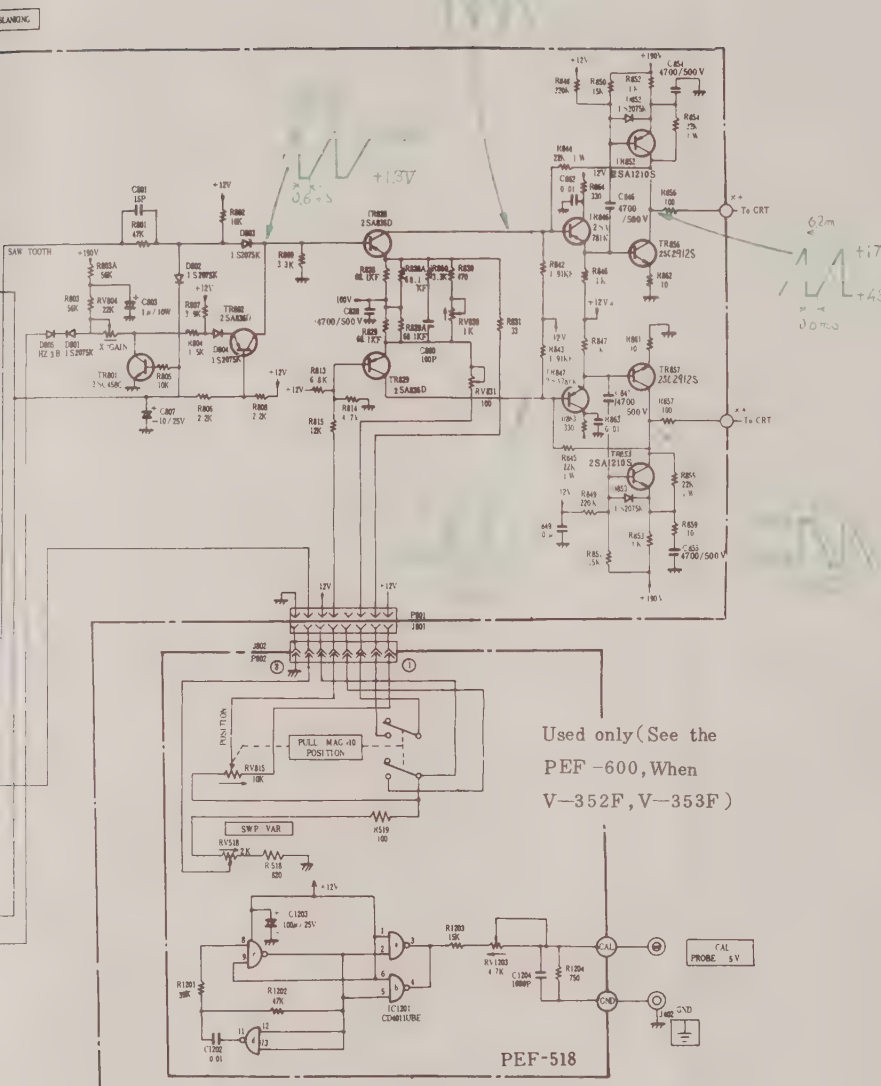
V-352F/V-353F
VERTICAL DEFLECTION
SCHEMATIC DIAGRAM ④

Note

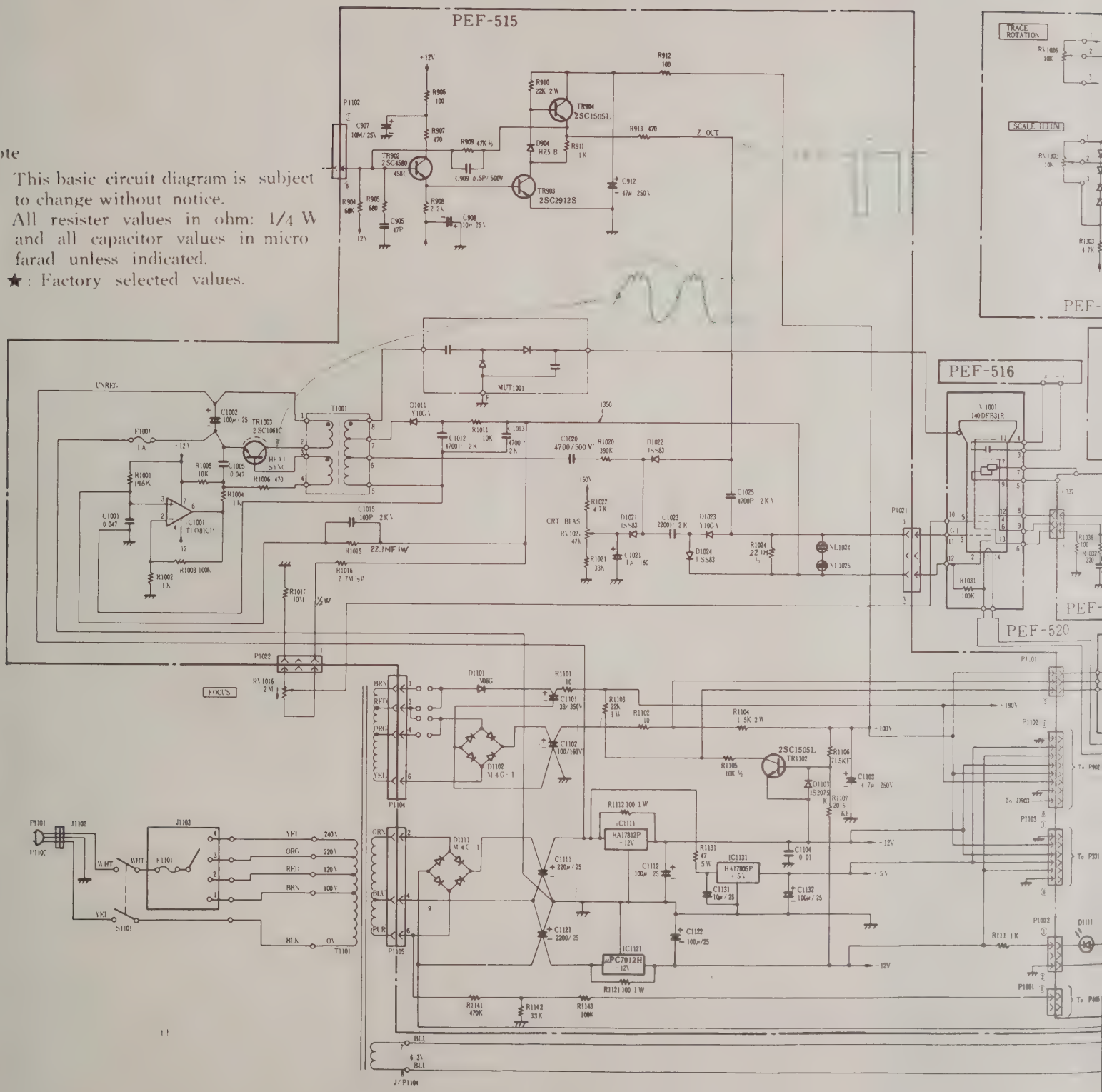
1. This basic circuit diagram is subject to change without notice.
2. All resister values in ohm: 1/4 W and all capacitor values in micro farad unless indicated.
3. ★: Factory selected values.

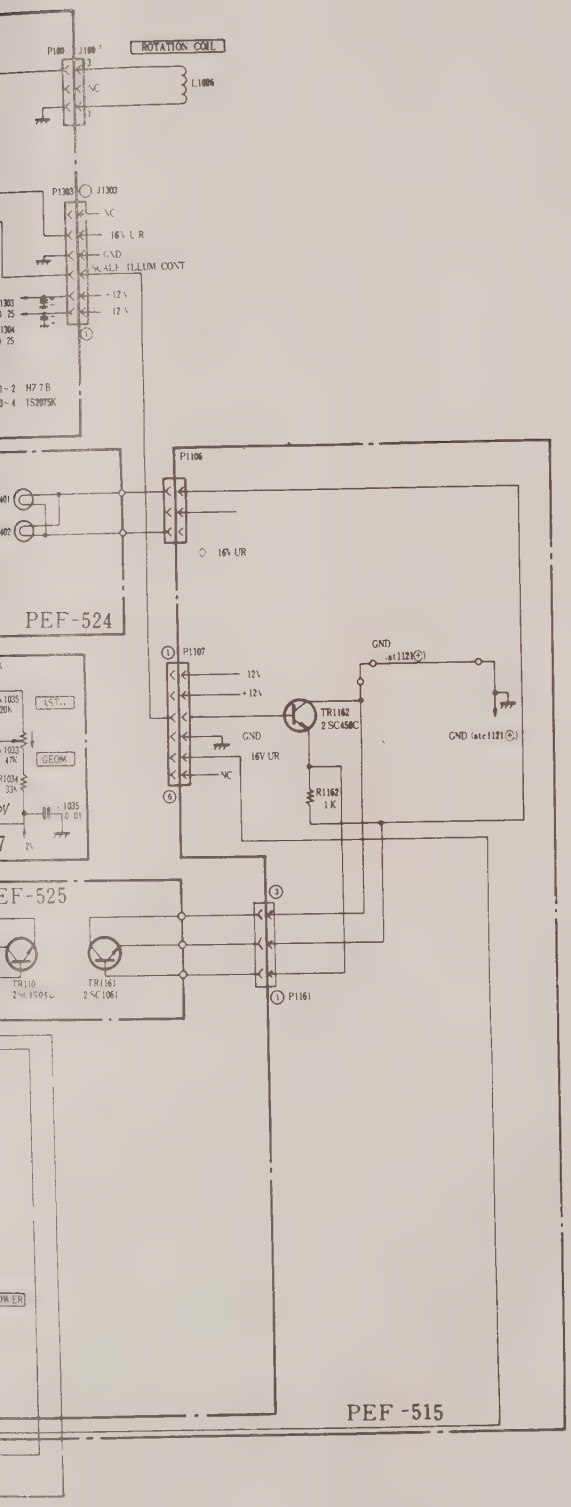


R503 560Ω(When V—353F)　※NC (When V—353F)

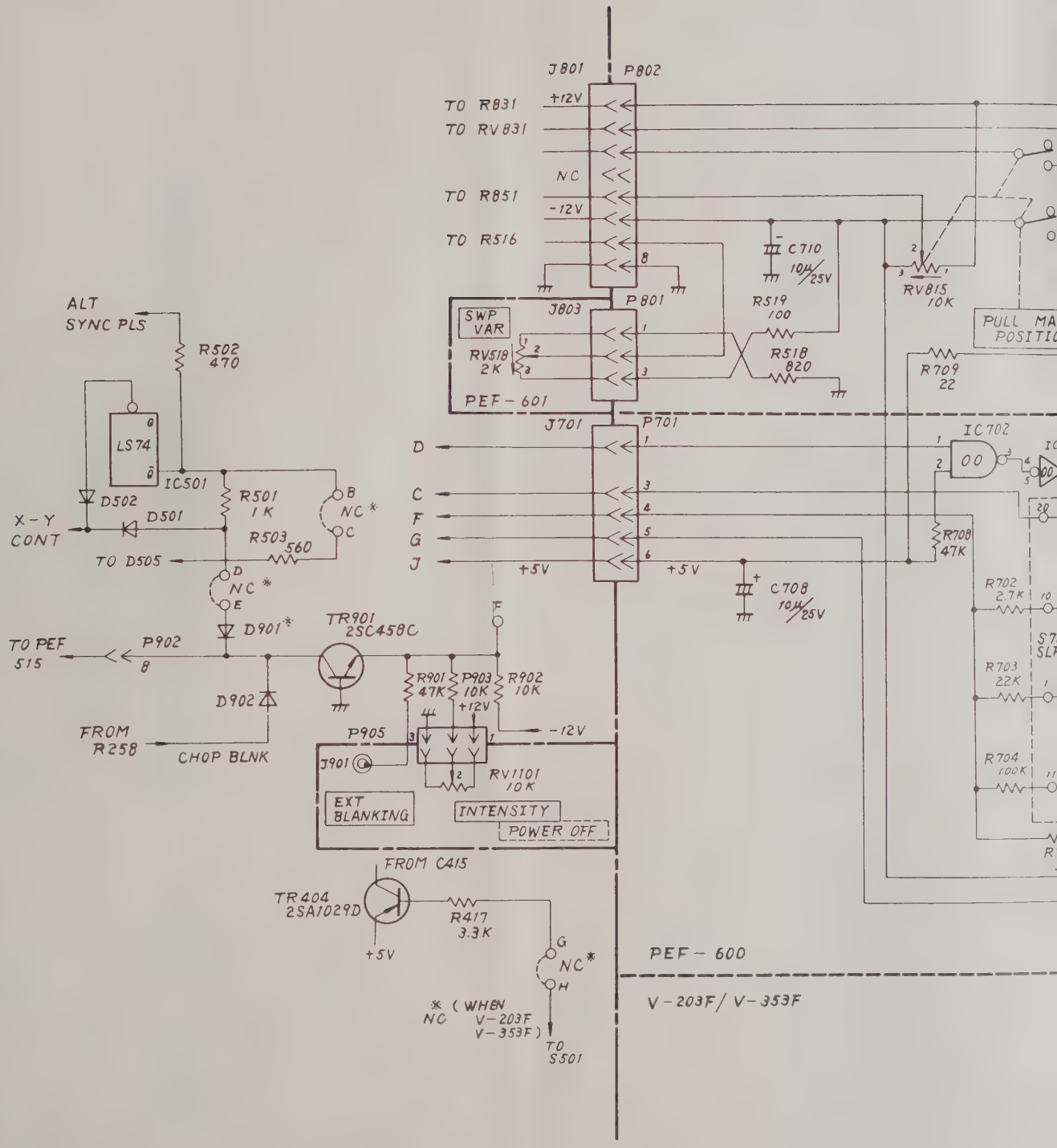


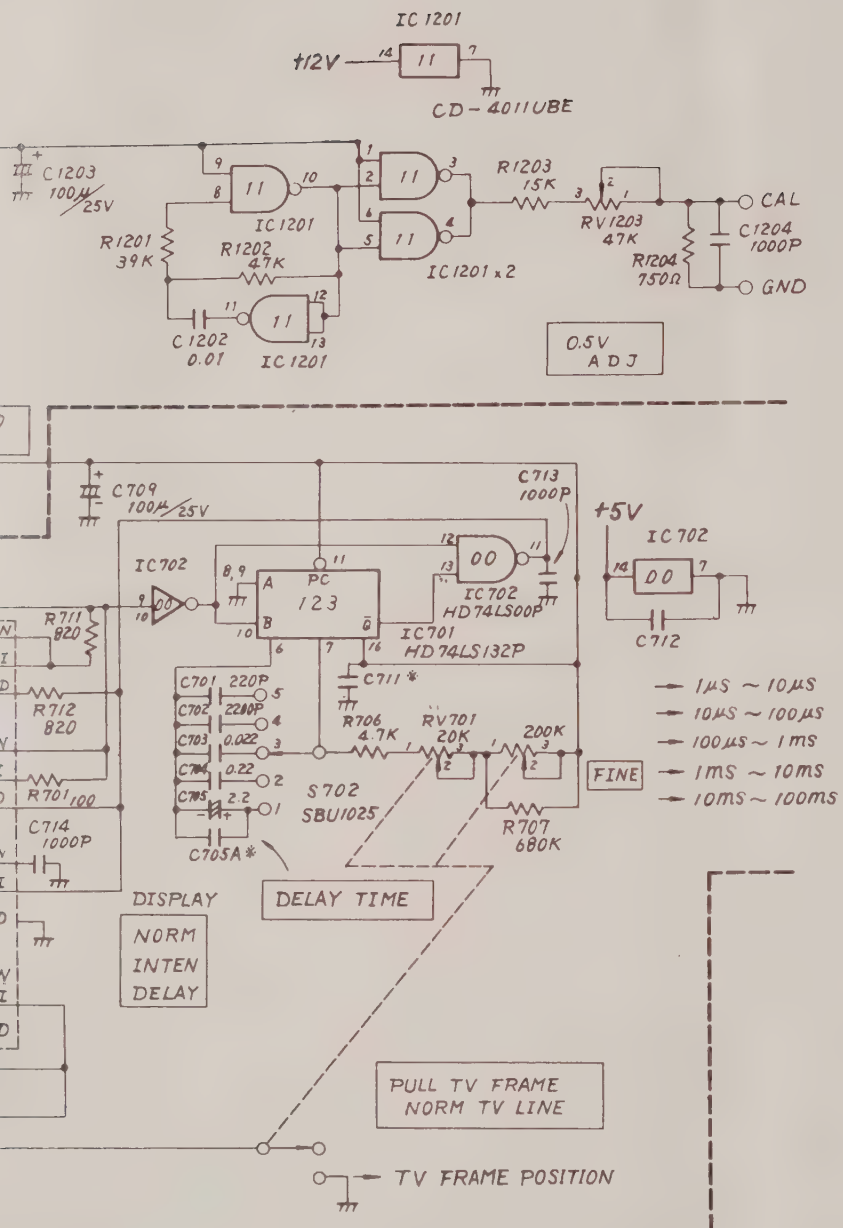
V-352F/V-353F HORIZONTAL DEFLECTION TRIGGERING AND CAL SCHEMATIC DIAGRAM ⑤


PEF-515
PEF-516
PEF-520
Note
1. This basic circuit diagram is subject to change without notice.
2. All resister values in ohm: 1/4 W and all capacitor values in micro farad unless indicated.
3. ★: Factory selected values.



V-352F/V-353F
POWER SUPPLY HIGH VOLTAGE AND CRT CONTROLES SCHEMATIC DIAGRAM ⑥


J801
P802
TO R831
+12V
TO RV831
NC
TO R851
-12V
TO R516
C710
10μ/25V
RV815
10K
SWP
VAR
J803
P801
RV518
2K
R519
100
R518
820
PEF-601
R709
22
PULL MA
POSITI
J701
P701
IC702
D
C
F
G
J
+5V
+5V
R708
47K
C708
10μ/25V
R702
2.7K
R703
22K
R704
100K
ALT
SYNC PLS
R502
470
LS74
IC501
D502
D501
X-Y
CONT
R501
1K
R503
560
TO D505
B
NC*
C
D
NC*
E
D901*
TR901
2SC458C
F
TO PEF
515
P902
8
R901
47K
P903
10K
R902
10K
+12V
D902
FROM
R258
CHOP BLNK
P905
-12V
J901
RV1101
10K
EXT
BLANKING
INTENSITY
POWER OFF
FROM C415
TR404
2SA1029D
R417
3.3K
+5V
G
NC*
H
PEF-600
V-203F/V-353F
* (WHEN
NC V-203F
V-353F)
TO
S501

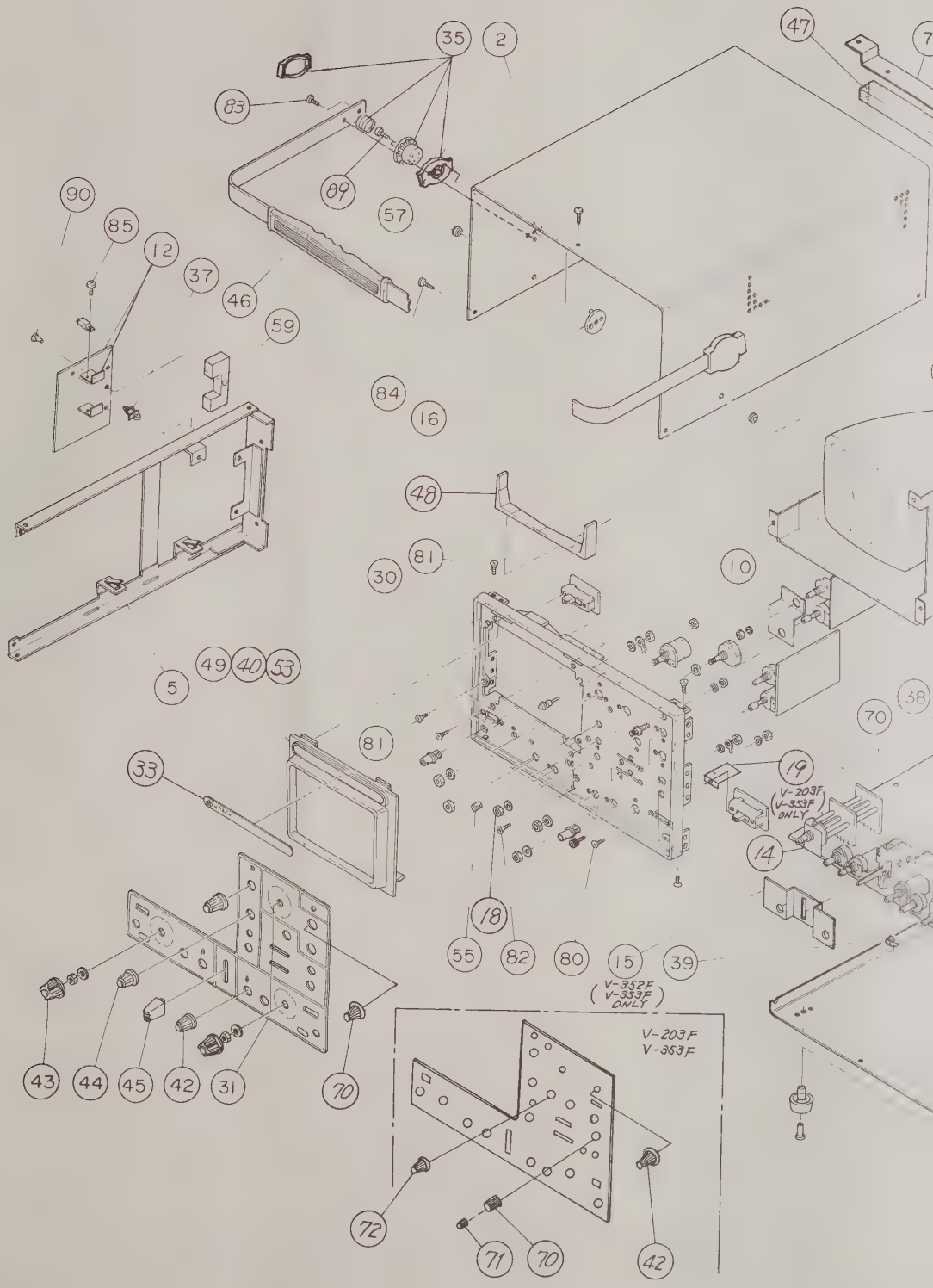


V-203F/V-353F
SINGLE TIME BASE WITH DELAYED SWEEP AND CAL SCHEMATIC DIAGRAM ⑦

8. MECHANICAL PARTS LIST AND EXPLODED VIEW

Part Code	Symbol	Description	Q'ty	Remarks
292452-B	1	Chassis, rear	1	
292453-A	2	Cover	1	
292454-A	3	Cover bottom	1	
292458-AA	4	Angle, right	1	
292459-AA	5	Angle, left	1	
3156120-A	6	CRT shield plate	1	
8345481-A		Cushion	1	
8345482-A	7	Bracket	1	
8345479-A		Cushion	1	
3144088-A	8	CRT band	1	V-202F,, V-203F, V-353F
3140791-A	8	CRT band	1	V-352F,
3144088-B	9	CRT band	1	V-202F, V-203F, V-353F
3140791-A	9	CRT band	1	V-352F
8345475-A	10	Bracket, VR	1	
8329719-A	11	Heat sink	6	V-202F, V-203F
8329719-A	11	Heat sink	4	V-352F, V-353F
8316092-A	12	Heat sink	2	
8381380-A	13	Shield case	1	
8318959-A	14	Earth plate	2	
8354104-A	15	Earth bracket	1	V-352F, V-353F
8377161-A	16	Screw plate	2	
8322308-A	17	Support bracket	1	
8355518-A	18	Nut	1	
8388770-A	19	Shield plate	1	V-203F, V-353F
117459-A	30	Subpanel, front	1	V-202F, V-352F
118290-A	30	Subpanel, front	1	V-203F, V-353F
292463-C	31	Panel, front	1	V-202F
2101630-A	31	Panel, front	1	V-203F
292463-D	31	Panel, front	1	V-352F
2101630-B	31	Panel, front	1	V-353F
293071-A	32	Panel, rear	1	
8345860-F	33	Nameplate	1	V-202F
8345860-G	33	Nameplate	1	V-352F
8345860-H	33	Nameplate	1	V-203F
8345860-J	33	Nameplate	1	V-353F
8348611-A	34	Shield band, CRT	1	V-202F, V-203F
8348612-A		Rubber	1	
8348611-B	34	Shield band, CRT	1	V-352F, V-353F
8348612-B		Rubber	1	
8377076-A	35	Handle stopper	2	
ERL0009	36	Band, SKB-3M	1	V-202F, V-203F
ERL0093	36	Band, SKB-3M	1	V-352F, V-353F
8340165-A	37	Support, LCBS-3NS	3	
8340165-D	38	Support, LCBS-8NS	6	
XC10097	39	Spacer, PS-4NS	1	
3156102-A	40	Filter	1	
3149317-A	41	Foot, rear	4	
3149321-B	42	Knob, S18	6	V-202F, V-352F
3149321-B	42	Knob, S18	7	V-203F, V-353F
3140804-B	43	Knob, S22	3	
3149322-C	44	Knob, S24	1	
3149325-B	45	Knob, LSW	3	V-202F, V-352F
3149325-B	45	Knob, LSW	4	V-203F, V-353F

Part Code	Symbol	Description	Q'ty	Remarks
3172097-A	46	Handle	1	
8345479-A	47	Cushion	1	
8345481-A	48	Rubber	1	
282239	49	Bezel	1	
3144055-A	50	Rubber	2	V-202F, V-203F
3144055-B	50	Rubber	2	V-352F, V-353F
8348612-A	51	Rubber	1	V-202F, V-203F, V-353F
8348612-B	51	Rubber	1	V-352F
3140755-A	52	Foot	4	
XCF0141	53	Clip, No.076	2	
8318971-A	54	Plate	1	
ERR0073	55	Bush, B312-250	1	
8345947-A	57	Bush, G-99, No.7199	2	
8348613-A	58	Plate lamp guide	1	
8354075-A	59	Support	1	
8353529-A	60	Rubber	1	
8340166-B	65	Protector	2	
PEF-515	70	Board	1	
8316093-A		Shield case, HV	1	
8318959-A		Earth plate	2	
8329719-A		Heat sink	4	
PEF-516	71A	Board	1	V-202F
8329719-A		Heat sink	2	
PEF-516	71B	Board	1	V-352F
PEF-517	72	Board	1	
8316092-A		Heat sink	2	
XCA0168	80	Screw, flat	4	M2.6x4
XCA7306	81	Screw, flat	7	M3x6
XCA7308	82	Screw, flat	3	M3x8
XCA7410	83	Screw, flat	4	M4x10
XCA6306	84	Screw	8	M3x6
XCA6308	85	Screw	22	V-202F, V-203F M3x8
XCA6308	85	Screw	20	V-352F, V-353F M3-8
XCA6312	86	Screw	4	M3x12
XCA1797	87	Screw	2	M3x20
XCA6410	88	Screw	4	M4x10
XCA6316	89	Screw	4	M3x16
XCA0661	90	Screw, sems	3	M3x8
8340167	92	Screw, sems	4	V-203F, V-353F M4x20
8340167-C	92	Screw, sems	4	V-202F, V-352F M4x20
XCA1855	95	Washer	3	M3
XCA1879	97	Washer spring	3	M3
XCA1706	99	Nut	3	M3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V-353F
ONLY
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V-352F
V-359F
ONLY
V-203F
V-353F
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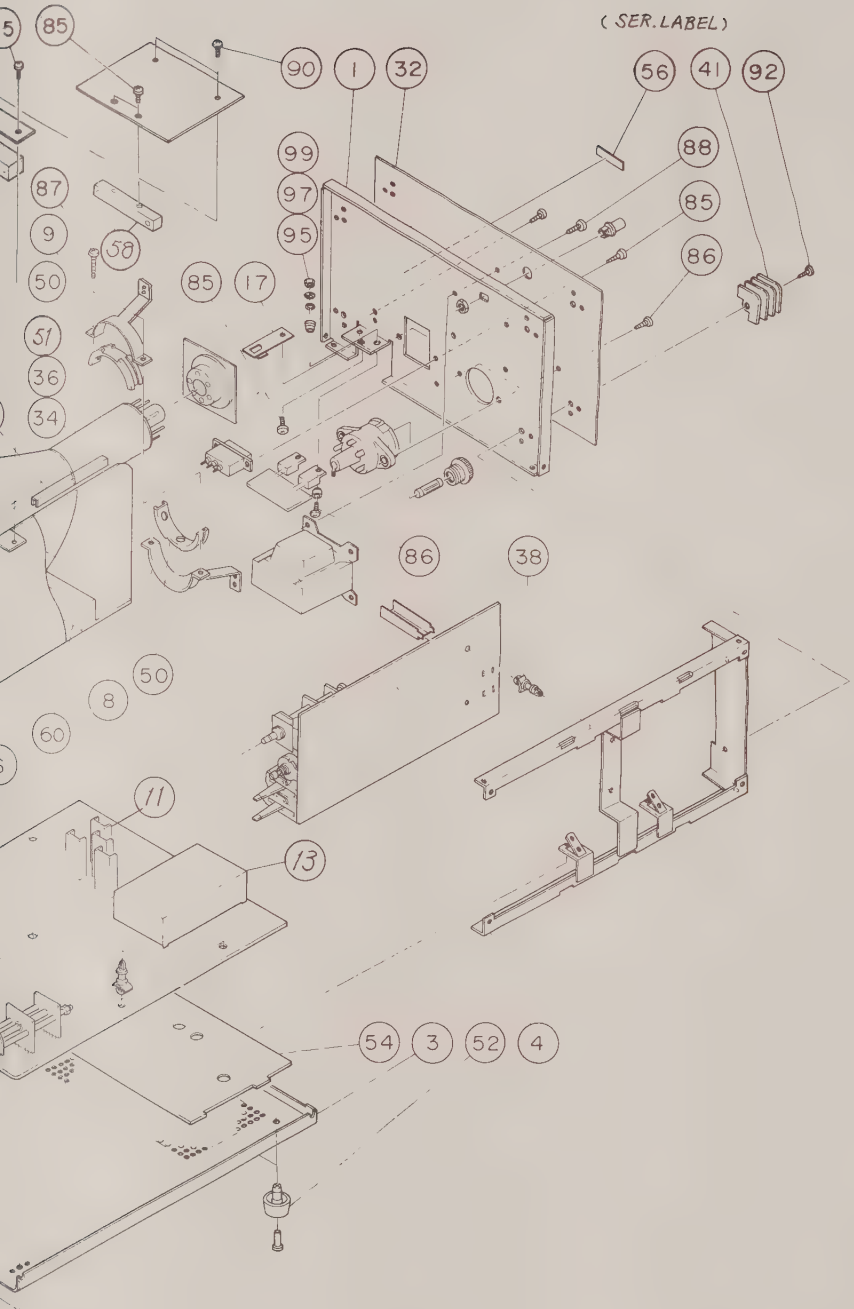

V-202F/V-203F/V-352F/V-353F

EXPLODED VIEW

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